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Institutional Controls at Superfund Sites
A Study of Implementation and Enforcement Issues. Ten Case Studies and Analysis

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This report is part of the National Network for Environmental Management Studies (NNEMS) under the auspices of the Office of Cooperative Environmental Management of the U. S. Environmental Protection Agency.

In recent years, institutional controls have come to play an increasingly prominent role in the remediation process at many Superfund sites around the country. Institutional controls are non-engineering mechanisms that restrict access to harmful contaminants but do little to clean up the contamination; the institutional controls remain a controversial issue. Detractors claim their use not only gives a false illusion of protection, but may actually undermine efforts to implement a more permanent technical remedy. Supporters within EPA counter that currant technology limits the extent to which many sites can be cleaned, and therefore these controls are essential to protect human health and the environment from residual contamination.

At present, there is no formalized process governing the design, implementation and enforcement of institutional controls. EPA headquarters is currently working on a draft guidance document on the use of institutional controls. The draft, however leaves a number of important issues unresolved.

This report combines policy discussion on institutional controls with 10 case studies selected as representative of recurring implementation and enforcement issues in real site situations. A series of recommendations follow the case studies.

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EXECUTIVE SUMMARY

In recent years, institutional controls have come to play an increasingly prominent role in the remediation process at many Superfund sites around the country. As non-engineering mechanisms that restrict access to harmful contaminants but do little to clean up contamination, institutional controls remain a controversial issue. Detractors claim their use not only gives a false illusion of protection, but may actually undermine efforts to implement a more permanent technical remedy. Supporters within EPA counter that current technology limits the extent to which many Superfund sites can be cleaned, and therefore these controls are essential to protect human health and the environment from residual contamination.

At present, there is no formalized process governing the design, implementation and enforcement of institutional controls, unlike the exhaustively detailed procedure for selecting technical remedies. Regional EPA offices, as well as state and local governments involved in designing controls as part of a remedy, have increasingly sought guidance from EPA policy makers on the best ways to use and maintain these controls. EPA headquarters is currently working on a draft guidance document on the use of institutional controls, which it anticipates completing and distributing to regional offices by autumn, 1988. The draft, however, leaves a number of important issues unresolved that EPA must solve before it can offer the kind of practical guidance needed by regional staff and governments.

This report combines policy discussion on institutional controls with 10 case studies selected as representative of recurring implementation and enforcement issues in real site situations. A series of recommendations follows the case studies. Some cases will inevitably lead to more questions than they answer. This report is offered in hopes that follow-up studies can build on these case histories and begin to develop some long-range answers.

GLOSSARY

ADVISORY - A recommendation issued to protect health and safety that is not enforceable by law.

ALTERNATE WATER - Bottled water, or, more commonly, a public water supply brought into an area by underground pipelines.

CERCLA - The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (Superfund).

DEED NOTICE - Information recorded in a property deed that will run with the deed through successive owners.

DEED RESTRICTION - A limitation on the use of a property enforceable through the courts and recorded with a property deed to run with the property through successive owners unless otherwise specified.

GROUNDWATER - Water that lies below the earth's surface (also Aquifer).

INSTITUTIONAL CONTROLS - Non-engineering mechanisms, particularly legal measures, designed to restrict access or exposure to a site with residual contamination.

NATIONAL PRIORITY LIST (NPL) - EPA's list of sites chosen for cleanup action under the Superfund program ranked in order of danger to public health, degree of contamination, mobility of contaminants and other criteria.

OWNERS/OPERATORS - Any present or past owner or operator of a site on the National Priority List or a site where EPA has undertaken a remedial action. Owners and operators are subject to CERCLA liability and cleanup cost recovery action.

POTENTIAL RESPONSIBLE PARTY - Anyone liable for cost-recovery action under Superfund liability, including former and present NPL site owners and operators, hazardous waste generators, transporters, and disposers.

REMEDIAL ACTION - Implementation of a technical process or institutional control designed to clean up or restrict exposure to an NPL site.

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) - The study of an NPL site and alternative cleanup processes before a final remedy is selected.

RESPONSIBLE PARTY - A potential responsible party made liable for cleanup cost recovery under CERCLA.

SARA - Superfund Amendments and Reauthorization Act of 1986.

FOREWORD

This report was written under the auspices of the U.S. Environmental Protection Agency's National Network for Environmental Policy Studies (NNEPS). The author is currently a second-year masters degree candidate at the Yale Graduate School of Forestry and Environmental Studies, specializing in the areas of ecology and environmental communications. She worked during the summer of 1988 for the EPA as a NNEPS summer fellow at the agency's headquarters office in Washington within the Office of Waste Programs and Enforcement.

This study was conducted to assess the agency's current uses of institutional controls - non-engineering mechanisms designed to limit harmful access or exposure to toxic substances - in the remediation of Superfund sites around the country. The use of institutional controls in site remediation has become common throughout the agency's ten regions, although a number of issues remain unresolved over the best selection, implementation and enforcement procedures for these controls. In addition, the use of instutitional controls remains controversial throughout industry, government and environmental groups as non-technical solutions that do little to further the actual cleanup of toxic wastes at Superfund sites.

EPA is currently in the process of designing a guidance document for its regional offices in the use of institutional controls. A meeting of regional chiefs in Seattle will address the issue of institutional controls as its top agenda item in November, 1988. This study was conducted through interviews of EPA project managers and legal staff, state and local government officials familiar with Superfund sites, reponsible parties and civic groups in five of the country's ten EPA regions to furnish EPA a case-study history of the issues and problems confronting the implementation and enforcement of institutional controls at Superfund sites.

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I. INTRODUCTION

Institutional controls are defined by the U.S. Environmental Protection Agency (EPA) as "non-engineering mechanisms used to prevent or limit access to contaminated areas and therefore reduce or eliminate risk."(1) In concert with engineering-based technologies such as incineration and containment of hazardous wastes in a sealed landfill, institutional controls constitute part of the cleanup remedy at many Superfund sites across the country. According to current EPA policy (2), these controls are meant to supplement the more costly, extensive technical remedies at most sites where they are used, except in extreme cases when controls are used as the primary remedy because a technical remedy is deemed "unfeasible." Examples of commonly used institutional controls include alternate water supplies in areas of groundwater contamination, and legal mechanisms such as land-use restrictions and well-drilling restrictions to prevent human exposure to contaminants remaining on a site. Other institutional controls include zoning ordinances to restrict certain kinds of land use on a site with residual contamination; deed notices to warn future property owners what hazardous wastes were stored and may still remain at a site; and advisories warning residents not to use well water contaminated by a nearby Superfund site.

Although institutional controls are never refered to in either the 1980 Superfund enabling legislation or the 1986 amendments, they appear in the recent draft preamble to the updated National Oil and Hazardous Substances Pollution Contingency Plan (NCP):

> As appropriate, institutional controls such as water use and deed restrictions may supplement engineering controls for short- and long-term management to prevent, or limit, exposure to hazardous substances, pollutants, or contaminants. Institutional controls will be used routinely to prevent exposures to

> releases during the conduct of a remedial investigation and feasibility study, during remedial action implementation, and as a supplement to engineering controls designed to manage wastes over time.

The NCP preamble also cautions against using institutional controls as a primary remedy except as a last resort:

> The use of institutional controls to restrict use or access should not, however, substitute for active response measures (e.g., treatment and/or containment of source material, restoration of ground waters to their highest beneficial uses) as the sole remedy unless such active measures are determined not practicable, based on the analysis of alternatives.

Despite the official acknowledgement of institutional controls in an important Superfund policy document, these controls remain controversial. Critics, including many environmental groups, local and state governments, charge that institutional controls not only fail to further the physical cleanup of a contaminated site, but may actually undermine the chance of a more thorough cleanup. EPA decision-makers, they charge, rely on institutional controls as a cheaper alternative to a costly technical remedy that would result in a cleaner site. Because institutional controls are primarily legal constraints, and subject to enforcement failures, detractors argue the controls foster a false sense of security while, in reality, doing little to prevent harmful exposure to residual contaminants. In the ongoing Rocky Mountain Arsenal Superfund case, discussed in greater detail in the case-study section of this report, a heated debate over institutional controls centers around this very issue. The federal government, in proposing an extensive list of long-term land-use controls for the Arsenal site, argues that the limits of current technology dictate that most sites will be left with residual contamination, and therefore institutional controls to prevent exposure to harmful contaminants are vital:

> Equating CERCLA's permanency standard with total site restoration would create a permanency standard that would be impossible to attain at virtually every CERCLA site. The existence of some residual contamination onsite is technically unavoidable at sites where contamination has entered soil or groundwater, a fact that is expressly acknowledged in CERCLA."(3)

Institutional controls appear in many of the cleanup remedies for Superfund sites across the country. In 1985, 11 of 68 records of decision (RODs) - the EPA document outlining the remedy chosen for each Superfund site - specified some form of institutional control.(4) Tallied under a separate catagory, 17 RODs called for bringing in alternate water, another form of institutional control.(5) In 1986, 30 of 84 RODs called for institutional controls, and 36 specified alternate water supplies.(6) In 1987, 20 of 75 RODs listed institutional controls, and 13 called for alternate water.(7) These totals include both first-remedial-action RODs - where actions such as alternate water are sometimes designed as the first phase in a remedy - as well as final-action RODs, where no further steps are planned.

The process by which institutional controls are incorporated into a remedy is now largely ad-hoc, varying from region to region, site to site, and according to the preferences and power of the players involved - federal, state and local governments, resident action groups and responsible parties. The lack of any set process by which institutional controls are researched, prioritized and finally chosen - as opposed to the exhaustive, painstaking method by which technical remedies are chosen - is a recurring theme of this report. Another central theme is the consequences this lack of set procedure has on the substance of institutional controls; for instance, the recurrence of bad controls, and unnecessary duplication of effort as each region labors to reinvent the same institutional controls.

Attendant themes explore the issues of who should be reponsible for implementing and enforcing institutional controls, how to promote better cooperation from local governments, businesses and residents in complying with institutional controls, and how EPA headquarters can offer better guidance on the use of these controls. EPA headquarters is currently working on a set of guidelines on the use of controls to distribute to regional offices. This report was written with the goal of providing case-study information and analysis to help this guidance effort.

To establish how institutional controls are currently incorporated into cleanup decisions and how well they are working, this study consisted of telephone surveys of federal, state and local officials involved with Superfund sites where institutional controls have been included in the cleanup remedy. Where possible, responsible parties, EPA regional counsel staff and EPA policy staff members were also interviewed. Each site survey consisted of two or more interviews, and involved officials of at least two different levels of government, including EPA and/or state and local government, to provide different perspectives. Site visits to four Superfund sites in New Jersey and New York State supplemented the telephone interviews.

The survey examined every Superfund site in regions I, II, III and IV where institutional controls were outlined in RODs issued between 1985 and 1987. In addition, several sites in Region V and the ongoing Rocky Mountain Arsenal case in Region VIII were examined. Region II, including New Jersey and New York State, was chosen as a region representing Superfund sites within highly developed, urban settings where populations are generally dense, development pressures are strong, and states play a strong role in environmental regulation with progressive environmental legislation. Region I, New England, was chosen as an area where the pervasive fractured-bedrock geology can make technical remedies unfeasible, forcing the consideration of institutional controls as a primary remedy. Regions III and IV were selected as areas with largely rural sites and less mature Superfund programs at the state level to balance the more urban situations in regions I and II. Time constraints limited more extensive examination of sites in Region V, a region known for its creative and progressive use of institutional controls. The Rocky Mountain Arsenal case was included to illustrate procedural issues in an ongoing debate over the use of institutional controls at a Superfund site.

Ten case studies were selected out of a total of 40 examined in the survey, and are presented either as illustrations of recurring implementation and enforcement issues with institutional controls, or as models of particularly effective or particularly ineffective controls. In some cases, additional sites are brought in to discuss variations on a theme. A discussion section precedes each case study, and draws on experiences at different sites for a general discussion of the procedural and substantive problems with institutional controls. The report concludes with a brief set of recommendations for future use of these controls. While institutional controls apply equally to other environmental statutes, the scope of this study was limited to their use under CERCLA.

II. Establishing Institutional Controls

There is currently no formal mechanism by which institutional controls are proposed or prioritized for inclusion in a site remedy. Sometimes they are formulated concurrently with technical remedies. EPA staff members within the Office of Policy Analysis (OPA) say it is not uncommon for the question of access and site-use controls to be raised by residents during a public hearing before the remedy is chosen. In other instances, controls are not considered until after technical cleanups are underway. Often attorneys for the state, local government or EPA may raise the issue of controls during remedy deliberations or consent decree negotiations. Sometimes controls emerge during negotiations between the various parties involved in designing the remedy - from the U.S. government, the state and local authorities to the owners, operators and responsible parties - as a consensus reached among conflicting interests. Sometimes owners/operators and responsible parties broach the subject of using institutional controls, often in the interests of lowering the price tag of the eventual remedy and thus their own portion of the costs. EPA, too, has demonstrated an interest in the cost-saving advantages of using institutional controls, while ensuring that the controls result in a remedy that is protective of public health and the environment.

EPA regions tend to differ widely on the frequency and range of institutional controls they include in RODs. Region V is notable for the creativity and detail of its institutional controls at various sites, while another region had not included a single control in any ROD through the end of 1986, and had controls at only two sites in 1987.

Despite the fact that institutional controls have not been formalized by Superfund legislation, their continued and increasing use in remediation indicates that they will remain an integral part of Superfund cleanups in the future. One consequence of the lack of a formalized procedure in devising institutional controls and setting guidelines for their implementation and enforcement is that EPA regions are often confused about how and when to use them. At least half of the 10 regions have made formal or informal requests to EPA headquarters for guidance in the use of institutional controls within the last two years (regions I, III, V, VI, and X). EPA headquarters is currently drafting a document for regional use entitled "Guidance on Use of Institutional Controls." The current eight-page draft of this document, while providing a needed definition of institutional controls, lacks concrete examples of the kinds of controls to use in particular situations, and therefore may not be the pragmatic reference regions can use when designing site remedies. Inclusion of such examples will add great usefulness to such guidance.

If EPA is to offer practical guidelines on the use of institutional controls, there are procedural problems it must resolve first. At present, institutional controls are an amorphous mix of barriers, conveniences (bottled water), legal restrictions, advisories and other means, all aimed at preventing harmful exposure to contaminants. According to EPA policy staff members, bottled water and fences are no longer considered within the strict definition of institutional controls, although they were labeled as such in RODs through 1987, and are still what many people think of when they hear the term "institutional controls." If preventing access to contaminated media is the principal aim of institutional controls, fences may be a legitimate form of control, if only as a temporary measure. EPA needs to resolve whether or not to prescribe the use of fences before it can offer guidance to the regions. The current practice of recommending a fence in a ROD, which may not result in the desired effectiveness, may foster a false sense of security. At the Combe Fill South site in New Jersey, residents and town officials acknowledge that the unremediated landfill is a popular spot for dirt-bike riding since anyone can step around the chain-link gate and ride in. At the Industriplex site in Woburn, Mass., residents are riding dirt bikes and picking berries on a residually contaminated site where a fence has repeatedly been torn down. At Powersville Landfill in Georgia, residents are still walking into the Superfund site and dumping their trash, although a gate now prevents them from driving in. At the Marathon Battery site in New York State, fences are not keeping fishermen and boaters from using a contaminated marsh.

Current issues facing the agency over the use and definition of well-water advisories and other "unenforceable" controls will have to be resolved before the regions know how to proceed. Advisories are public notices to area residents and businesses recommending that they discontinue using well water known to be contaminated, but the notices are not legally enforceable. The draft guidance document by the EPA Office of Policy Analysis (OPA) prescribes advisories as remedies worth trying, while acknowledging that they are unenforceable, because they are cheap and easy to implement and may add some layer of protection if heeded. The Office of Emergency Response and Remediation (OERR) argues that advisories should be recommended but not labeled "unenforceable," so as not to defeat them before they are even implemented.

Once the Agency has defined a clear set of workable institutional controls, it becomes necessary to prescribe when to use them; under what circumstances, and for how long. By formally condoning long-term institutional controls, such as land-use restrictions, EPA now implicitly acknowledges that certain cleanups are less than perfect restorations. But this acknowledgement may be necessary to help define and choose the kind of controls needed in certain situations, and to justify their use. With a clay-capped landfill remedy, for instance, it is imperative that the cap not be damaged and contaminants re-exposed by well-drilling, earth-moving or other development activities. Therefore some kind of institutional control banning these uses is necessary, and on a long-term basis. This also acknowledges that the site cannot be used again for anything that would place people or the environment in jeopardy of contamination exposure. If capping a site automatically precludes further human use or mandates limited future use of a site, it should be acknowledged outright, and the land-use or water-use control be implemented just as automatically. At the clay-capped Lehigh Electric Superfund site in Pennsylvania, future land use remains an unresolved question.

In many clay-cap remedy situations, EPA and states are forced to play a passive, reactive role, only empowered to take action once a developer or new owner has destroyed the integrity of a cap. CERCLA liability covers only those actions that have damaged a remedy, but does nothing to prevent the damage in the first place. A more preventive approach - either by taking or designating responsibility to implement and enforce specific use restrictions before the cap is completed, or by persuading local communities with active hazardous waste operations and landfills to enact ordinances restricting the future use of a site once it is closed - would result in a more effective system to ensure that the controls will be implemented.

Another procedural issue EPA must resolve is determining who is responsible for implementing and maintaining institutional controls. Several of the case studies included in this report illustrate situations where institutional controls outlined in the RODs were never assigned to a responsible party to oversee their implementation or enforcement, and were never used. In other cases, the responsible party was identified but had objections to the kinds of controls recommended, and simply refused to make any effort to implement them.

EPA is divided on the issue of who should oversee the implementation and enforcement of institutional controls. In the draft guidance document, OPA suggests that the lead agency - the party responsible for organizing the remediation effort, whether it is the EPA, the state, a local government or a private responsible party - be the one to determine maintenance responsibility for institutional controls. The draft further suggests that state-lead and local-lead projects have the best chance of ensuring enforceable controls. OERR, by contrast, argues that the state should have sole responsibility for ensuring that controls are working through its statutory responsibility for operation and maintenance (O & M) of a Superfund site remedy it has approved and concurred on: "OERR policy is that the State Agency, as part of its concurrence in the selected remedy, agrees to be responsible for any required O & M at the site. We consider the effective implementation of any institutional controls, and appropriate monitoring of institutional controls to be a component of O & M. The guidance should reflect this policy and delete all reference to IC (institutional controls) being the responsibility of the lead agency."(8)

The draft guidance document does acknowledge that maintenance of institutional controls is minimal, at best: "Limited information to date suggests that ICs are now not typically monitored after they are put in place." Interviews conducted for this report confirmed the same. Since institutional controls are neither costly to implement nor expensive to maintain, the lack of maintenance must stem from other considerations. Interviews for this report suggest that the ROD either failed to identify any responsible party to carry out maintenance and monitoring duties, or that those made responsible were hostile to the controls and not inclined to make them work.

The process of assigning responsibility for implementation and enforcement of institutional controls should follow two general rules: 1) responsibility should not be delegated to a party that has no capability of enforcing a chosen control, and 2) controls should not be implemented or enforced by parties that have a vested interest in seeing the controls fail.

For example, assigning O & M responsibility for an institutional control automatically to the state makes little practical sense in a case where the state would be asked to enforce a local-government ordinance. Responsibility ideally should be assigned according to the form of control used, and according to where the control originates. A state law creating well restriction areas, such as New Jersey's, would be difficult for a local government or the federal government to enforce, and properly belongs to the state to oversee. In cases where multiple controls are outlined in the ROD, it may make sense to divide maintenance responsibilities accordingly, assuming proper coordination between the parties takes place.

One exception to this would be to deny responsible parties and owners/operators (including municipalities) the opportunity to implement or enforce institutional controls upon their own properties. In the case of the Powersville Landfill site in Georgia, a private owner has been delegated the task of devising institutional controls and, not surprisingly, has not come up with any to date. There seems to be little incentive for a polluter, who has shown scant concern for the public welfare or the environment in years past, to suddenly make a long-term effort to protect area residents and the environment from continued harmful exposure through enforcing institutional controls. And in many cases, land-use restrictions and future-development restrictions hurt the development potential or resale value of an owner's property. Owners may be reluctant to implement a deed notification, let alone a deed restriction, that may have negative economic consequences for them, and are not a good choice to be the enforcer of such a control.

The Olean Well Field site in southwestern New York State illustrates the problem with allowing parties with vested interests to help design remedies and institutional controls. At Olean, residents and local officials actually argued in favor of a less costly technical remedy and more institutional controls, seemingly against their own health interests, for fear that a costly remedy would bankrupt three major local employers named as responsible parties for the site. Many of the residents in town were employed at one of these three industries, and the town itself relied heavily on them for a tax base. At numerous sites in this survey, local governments expressed reluctance or dislike for enforcing land-use restrictions that diminish present or future tax revenues. In each case, responsibility for enforcing the controls best designed to protect the area from contamination exposure should be delegated to a party without a vested interest in seeing the control fail, such as the state or the EPA.

III. Substance of Institutional Controls

Ensuring that a chosen institutional control will be well-suited to a site, and increasing the chances of its acceptance and of compliance, has to do with the substance of that control. Some EPA regions currently limit their range of institutional controls options to alternate water and fences or other site-access restrictions. Other regions seem to view institutional controls not as a static set of options but as an evolving concept with opportunity for highly creative applications. In either case, site surveys revealed that most institutional controls tend to work best if there is full cooperation at the state, local and general-public level. Sometimes ensuring better cooperation is not a matter of rejecting an unpopular institutional control, but a matter of making it more acceptable to those who must live with it.

For Superfund sites where groundwater contamination is so pervasive that alternative water is considered a necessity, such as the Combe Fill South site in New Jersey or the GE/Moreau site in New York State, and where the local government is opposed to the way alternative water has been offered to them in the ROD, it might make sense to be more accommodating to the local government's wishes. In the case of Combe Fill South, the town of Chester has legitimate concerns about becoming dependent upon a small, neighboring town's water supply. In the event of a shortage, they argue, Chester residents will lose out to their neighbors. The town of Moreau, too, has concerns about hooking up to a limited, small-community water supply in an area experiencing rapid development. In both cases, these towns could and would prefer to join larger, regional water supplies for nominally more money, a cost representing a small fraction of the entire, multi-million dollar remediations proposed at these sites. EPA, however, has legitimate concerns that Superfund not be used to finance the future growth of a town or region, but limit its expenditures to cleaning up the environment. If EPA and the state's objective is to get people off their contaminated wells as quickly as possible and bring in a new water supply with the greatest speed, overcoming local resistance by the expenditure of an additional few thousand dollars makes sense where it can be achieved within the agency's mandate.

Countering resistance from residents opposed to closing their private wells by overcoming financial objections to hooking up to a public water supply has been successful at a number of different Superfund sites. Residents accustomed to what they consider "free" well water often show reluctance to start paying for public water, despite knowing the dangers of their contaminated well water. Some local governments, like the town of Olean, went as far as paying the cost of resident hookups themselves, or got the responsible parties to pay for the hookups, to give residents more incentive to switch to public water. New Jersey Department of Environmental Protection (NJDEP)'s Ed Putnam said he has toyed with the idea of writing a state brochure to publicize the true cost of operating a private well - the electricity to pump the well, and about $2,000 every ten years to replace the pump and parts - to convince residents their well water is not "free" and not necessarily cheaper than public water. EPA Region II's Edward Finnerty questions to what degree the government should invest effort, money and time on protecting well-owning residents unwilling to switch to public water, when there are so many other high-priority environmental problems to solve.

As several of the case studies illustrate, the designation of a Superfund site can cause adverse publicity for a town, for area businesses and for homeowners. Superfund remediation policy should recognize this phenomenon and help to mitigate it in the interests of gaining better cooperation from local governments and residents. In the Williams Property site in New Jersey, residents living inside a one-mile-radius boundary where a well-drilling and new-development ban was established by the county experienced many problems trying to sell their property or in getting home loans from area banks. After four years, the county agreed to lift the ban, and ease the hardship for local landowners, primarily because alternate water was made available soon enough to allow new building to resume. At the GEMS Landfill site, local residents were angered by the state of New Jersey's action to automatically record in the deeds of affected properties that they fell within a well restriction area. The deed notices and attendant publicity left a real-estate "black mark" on the properties, according to NJDEP's Putnam. An appeal to the U.S. Department of Housing and Urban Development succeeded in overriding the notice requirement, and the state has since agreed to tread more lightly and send a notice of water-use restrictions in a less alarming fashion, said Putnam. Notification now includes wording to the effect that well drilling would not necessarily be banned if owners can tap into a deeper, uncontaminated aquifer, and development would not cease if a public water supply exists in the area. Alerting the public, and potential buyers or renters in particular, that an area has experienced groundwater contamination and that its wells are unsafe to use is critical and should not be hidden to appease current property owners or local development interests. But there should be some consideration of the best way to implement a control without penalizing, if possible, the "innocent" property owners who happen to have the bad luck to live near a discovered Superfund site.

The West Virginia Ordnance site illustrates another kind of substance issue. EPA and state officials who devised the remedy decided to rely on a pre-existing, deed-restriction control that made the contaminated site a wildlife park and restricted all human habitation there - in lieu of a technical cleanup to the degree required for human habitation. EPA tests, however, found that the residual toxicity would have to be many times greater than it is to cause toxicity to humans who ate fish or game killed on the site by exposure through bioaccumulation of toxins in the game species. Any site that combines residual contamination with access to hunting and fishing must also implement some kind of mandatory testing for toxicity levels for all game species, and set limits on what levels are safe for human consumption. Apart from the important issue that residual contamination is bound to be harmful to the wildlife remaining on the site, the threat of harmful exposure to humans through concentration of toxics up the food chain is obvious. This risk requires a concrete policy to protect everyone who is allowed access to the site for hunting and fishing, as has been done at the West Virginia Ordnance site at Point Pleasant.

Similar threats of toxin bioaccumulation occur at a number of Superfund sites around the country. When officials come to realize that an institutional control is flawed or not working, there should be a way to revise or replace that control, and to alert other regions to the problems experienced at one site so that each region is not destined to repeat the same mistake. One suggestion for alerting officials to controls that tend to work well, or work poorly, is a national clearinghouse of information on controls implemented at Superfund sites, and periodic follow-up studies of how they have performed. If another region was considering a similar plan to turn a residually contaminated site into a game reserve and knew about the problems experienced at West Virginia Ordnance, it might reconsider, or adjust its controls to avoid the same exposure problems.

Another advantage of circulating case information on institutional controls to all the EPA regions is that some regions could benefit from the creative breakthroughs of other regions. This does happen occasionally in an informal way between

regions. During the researching of this report, an EPA attorney from Region X desiring a good model for a land-use restriction found one through an attorney in Region V who had just drawn up extensive land-use controls at the Seymour site in Indiana. The Region X attorney made the effort to survey other regions to see what already existed.

Models of well-use restriction ordinances, site-use restrictions and other controls that could provide EPA regions, states and local governments with prototypes to adapt to their own needs would be a worthy objective of EPA guidance. The two documents listed in the appendix of this report - the consent decree of the Seymour, Indiana site and the sale agreement involving the Chisman Creek site - are offered as models of creative, successful institutional controls that could be tailored to fit many different sites.

IV. TEN CASE STUDIES

CASE 1: CONTAMINATED GROUNDWATER AND CLOSING PRIVATE WELLS
The Williams Property/ Combe Fill South Landfill

Preventing access to contaminated groundwater through the use of institutional controls can be difficult when a landowner does not wish to give up the use of a private well. The problem is so common at Superfund sites in rural areas that EPA commissioned an extensive survey of groundwater use controls in 1986.(9) The study concluded that 1) regulating the drilling of future wells in a contaminated area is easier than trying to close existing wells, and 2) very few state or local governments have the legal authority to close an existing private well, although many can regulate public wells. The Williams Property site represents a situation where a majority of residents faced with contaminated well water voluntarily switched to a public supply but an uncooperative responsible party refused to give up his well or cooperate in restricting access to contaminated soils and groundwater on his property.

The Williams property, a 5.6-acre parcel of residential land in Cape May County, New Jersey, is considered something of a classic among single-party Superfund sites. In 1979, junk dealer Theodore Williams accepted 150 drums of sludge and liquid chemical wastes dumped onto his land. Emergency cleanup action by the New Jersey Department of Environmental Protection (NJDEP) in 1980 removed 1,200 cubic yards of contaminated soil, but groundwater contamination appeared subsequently.(10) The shallow, sandy soil of Williams' land and surrounding properties acts as a rapid conduit for contamination into the aquifer below. EPA recorded elevated levels of bis(2-ethylhexyl)phthalate, PCE, methylene chloride and xylene in the soil and in the groundwater.(11) The cleanup remedy included extraction and treatment of contaminated groundwater with discharge into the underlying aquifer, excavation and offsite incineration of 700 cubic yards of contaminated soil, regrading, backfilling with clean soil and revegetation, and providing residents with contaminated wells an alternate water supply.(12) Institutional controls mentioned in the ROD are less well-delineated; the ROD states only that they will "be identified during the remedial design phase."

Although the remedial design phase was not completed until spring of 1988, institutional controls were actually implemented much earlier. In Williams, EPA had the benefit of strongly committed county and state environmental agencies with progressive well-restriction legislation already on the books and a willingness to enforce institutional controls. On April 1, 1984, the Cape May County Board of Freeholders instituted a ban on all well drilling within a one-mile radius of the Williams site to prevent the drawing of contaminated water or precipitating plume movement. This ban temporarily halted all construction in the one-mile area, since there was no available piped water supply to use in lieu of a well. Residents within 200 to 300 yards of the site were asked to switch over to an incoming water supply line once it was brought into the area, and instructed to stop using their drinking wells.

NJDEP and county officials said that everyone except Mr. Williams agreed to hook up to public water. The county health department had to obtain a court order in 1984 to force Williams to stop using his own well, the most contaminated in the area. Williams has since filed suit to keep his well in use, and government countersuits to force Williams to clean up his property are now pending in court.

In May, 1988, the county voted to lift the well-drilling ban since almost everyone in the affected area was hooked up to public water, and water lines were available so any new developments could tap into them once completed. NJDEP has also designated the site and some surrounding properties as a Well

Restriction Area, banning new well drilling for five years in the immediate path of plume migration and for ten years where plume migration is projected to extend.

Several factors conspired to make institutional controls at the Williams site work effectively. The county was willing to adopt, at the time, a controversial building ban in an area with moderate growth pressure for seasonal vacation development. According to Middle Township grants supervisor Kathleen Meers, 90 percent of the residents in the area wanted public water brought in anyway, and were very cooperative about switching over from their wells. Meers said the publicity surrounding the discovery of the Williams site and tainted groundwater caused a slump in the area housing market as potential buyers shied away from buying homes, and banks refused to grant home loans, making the switch to public water a necessity for most residents and businesses. The township itself, originally opposed to the one-mile ban because of the drop in development and revenues it would bring, eventually cooperated in bringing water lines to the area. The town put up $400,000 to dig trenches for 1 1/2 miles of water line, rented equipment and offered its own employees to do the labor, said Meers. The township also orchestrated hookups for residents with area plumbers. As a result, people in the affected area were provided with an alternate, safe water supply much faster than they are at many sites, and much faster than had been required under the ROD specifications.

While the building ban was not immediately popular, Cape May County Health official Raymond Chadwick, Jr. said the county stopped short of trying to force residents, through additional legislation, to close their wells and switch to public water. Chadwick said the county could not legally require residents to switch to public water since the water supply company was privately owned, and added that residents already had enough incentives to want to switch. The county has continued to make hooking into the piped water supply a condition of receiving a building permit in the area contaminated by the plume.

NJDEP, with its progressive well restriction statute(13), was able to step in and prevent any ensuing damage to the aquifer once the county one-mile drilling ban was lifted, by making the site a Well Restriction Area. The restriction area allows the state to rule on whether or not to grant a permit to drill a well. The state does not grant a permit to drill if the well would tap an aquifer with contamination elevated above state allowable concentration levels. The well restriction area can ensure against interference with the aquifer during the remedial groundwater extraction and treatment process, which will not start at the Williams site until contract bids are announced this October, according to county Senior Environmental Planner Jeanne Hansen.

While local and state environmental officials have been able to prevent access to, and protect area residents from, contamination through enforceable institutional controls, they have fared less well with the Williams site itself. While the ROD recommends a fence to prevent unrestricted access to the property, there was no fence at the site on a recent visit, and there never has been, said local officials. County health officials acknowledge they are concerned that area children have free access to the site, and can be seen on the property. Trying to prevent Mr. Williams or others on his property from harm through exposure to contaminated soils and groundwater has so far proved unenforceable.

The Combe Fill South Landfill site in Chester, New Jersey represents a similar case of trying to close contaminated private wells and bring in alternate water, but is further complicated by the absence of a nearby public water supply. The site, a 115-acre landfill located in the midst of an affluent residential community and near a state park, accepted municipal garbage as well as non-hazardous industrial wastes, sludge, chemicals and waste oils for 40 years, and may have accepted illegal hazardous wastes as well.(14) The porous substrate below the landfill allowed rapid leaching of contaminants into the groundwater, and concentrations of volatile organics have appeared in resident drinking wells nearby.(15) Remedial action includes gas collection, groundwater pumping and treatment, site fencing and alternate water supplies. While the ROD was signed in September, 1986, most residents with contaminated well water in the area are still using bottled water, according to Chester, N.J. Health Department official Vincent Salvatoriello. Others are still using their wells, he added. Because the town had no existing public water supply, it was in the position of buying water from nearby Washington township and building water lines to the affected area, or else creating its own water district and building a public water supply from scratch. NJDEP official Edgar Kaup said the state has made the area a Well Restriction Area and can therefore control the drilling of any new wells, as well as require residents to close their contaminated wells. NJDEP engineer Edward Taylor, however, conceded that closing existing wells has not been easy. "People are not too enthusiastic about this, they're quite content to go on using their wells," one state official explained. Taylor said that closing an existing well requires the authority of a local ordinance. Chester, however, appears to be in no hurry to enact an ordinance closing private wells until it has secured the public water supply of its choosing. Salvatoriello stated that town boards and area residents have agreed they do not want to contract with Washington township for water and be dependent on a neighbor with a limited supply. The town is currently trying to get the state to pay for creation of a Chester water district and new public waterworks. Because the area is a state Well Restriction Area, residents have been denied permits to drill wells for any new development. Salvatoriello said he and other town officials consider the ban unfair to the property and land-use rights of area residents. One resident has sued the state to keep a well open despite contamination, added NJDEP's Taylor.

CASE 2 - CLOSING PRIVATE WELLS AND COOPERATION INCENTIVES

Caldwell Trucking Site/ Olean Well Field

At some sites, government officials are countering resistance to closing private wells with innovative programs and financial incentives. In other cases, officials are having to find creative solutions to an endless variety of enforcement problems, from residents who don't want monitoring wells installed on their property to indemnification issues. At Caldwell, EPA and NJDEP instituted several programs that, while tangential to the actual cleanup, helped the process move along much more smoothly.

The Caldwell Trucking site in Fairfield township, New Jersey, is a 12.2-acre site surrounded by light industry and an airport. Groundwater in the area is badly contaminated from three decades of mixed waste disposal in unlined lagoons on the property, resulting in elevated concentrations of volatile organics, PCB, TCE, PAHs, inorganics and lead.(16) The groundwater flows into the nearby Passaic River, a public water supply for the area. One hundred homes near the site are currrently or potentially at risk from drinking contaminated well water. Remediation includes excavation and heat treatment of 28,000 cubic yards of contaminated soils and waste materials followed by on-site disposal; air-strip treatment of public well water, and alternate water for residents at risk from well-water contamination.(17) Because groundwater contamination was spread over such a large area, the issue of placing monitoring wells offsite created a problem at Caldwell. According to EPA Region II project manager Edward Finnerty, the contractor's hydrologists wanted to install 12 monitoring wells, all on private property, to chart the progress of plume migration. The EPA eventually got permission from 11 of the 12 property owners, but had to take the last one to court. Finnerty suggested the state and EPA might consider a policy whereby residents are compensated for the inconvenience of having a monitoring well put on their property. He said towns routinely pay residents a nominal fee, such as $500, for the inconvenience of digging up a part of their property to lay a utility line or a sidewalk.

One thing EPA has done at Caldwell and other sites to help foster cooperation among residents over monitoring wells is to alter the design of the wells to be as inconspicuous as possible, e.g. making the casing flush with the soil. In access agreements with private property owners at Caldwell, EPA also agreed to restore the property once the well has been installed.

A second issue that has come up recently at Superfund sites, including Caldwell, is indemnification by contractors. Finnerty said residents are concerned whether the contractors who install the monitoring wells have enough insurance to cover liability if residents hurt themselves on one of the monitoring wells. Finnerty said EPA is now reassuring residents that contractors have plenty of insurance.

EPA and NJDEP are now in the process of trying to get 300 residences and businesses in the area of the Caldwell site hooked up to a public water supply. Over the past six years, a total of 230 have hooked up to public water, all at their own expense, which can run up to about $2,000 per household. Finnerty said the remaining 70 are currently experiencing no signs of well contamination and are reluctant to switch to the comparatively poor-tasting public water when they are not convinced their well water is in jeopardy. Many residents also balk at paying the extra expense of public water, as they consider their well water to be "free."

At the Olean Well Field Superfund site in New York state, environmental officials have circumvented resident reluctance to switch to a for-pay form of water by requiring the responsible parties to pay for the hookups as well as an additional $625 to each homeowner as the cost differential between what well maintenance costs and what water bills will cost for a short-term period. "It's a bribe, more or less," explained one Olean town official. Responsible parties are also paying the cost of bringing water lines into the town. Construction of water lines was slated to begin in summer of 1988 after the town voted to support the creation of a town water district.

The issue of closing existing private wells also arose at Olean, but the town reacted with an ordinance designed to limit wells to non-drinking uses rather than to force their closure. Homeowners must sign a right-of-way agreement with the town stating that the contractor will disconnect their well from all drinking-water and shower-water taps before connecting their home to the public water supply. That way, explained Olean Town Supervisor Bruce Kenney, residents can continue to use their well's "free" water through outdoor spigots for washing cars and watering lawns. The county health department also conceded that they had no authority to go in and seal up existing wells. "The county rule is, they can't legislate intelligence," stated a town official. The county does have the authority, however, to intercede on behalf of a tenant if a landlord refuses to stop using contaminated well water, and can force the landlord to hook up to the public water supply.

Another concern arose at Olean over the issue of competition between private and public wells when faced with a limited water supply. Part of the remedy at Olean called for reactivation of city wells to pump and treat aquifer contamination. Residents with private wells grew concerned that the large-volume pumping by reactivated city wells would soon dry up their wells. EPA left this dilemma up to the city and private well owners to resolve, according to town officials.

CASE 3. IMPERMANENT REMEDIES AND FUTURE LAND USE

Lehigh Electric Site/ Combe Fill North/ Friedman Property / Seymour, Indiana

At the heart of the controversy over institutional controls is the question of future land use. If Superfund sites were cleaned up to the point where they posed no future threat to human health or the environment, there would be no need for long-term institutional controls. However, as EPA noted in its response to comments on the ongoing Rocky Mountain Arsenal case, it is virtually impossible for current technical remedies to guarantee a 100 percent clean site. The majority of site cleanups in 1985, 1986 and 1987 chose no-action or containment remedies over permanent removal and destruction of contaminants. Other sites deferred decisions on treating contaminated groundwater or set up long-term treatment over 10 or 20 years. In each of these cases, future land-use remains an open question. Current EPA policy, bolstered by the 1986 amendments, is to favor permanently effective treatment technologies and restore sites to their most beneficial use. At Lehigh Electric and other sites, efforts by individuals to develop sites with residual onsite soil or groundwater contamination has forced officials to face the question of future land use.

The Lehigh Electric site in Old Forge, PA was an industrial plant near the Lackawanna River where extremely high concentrations of PCBs were found in the soil, some up to 110,000 ppm.(18) The remedy includes removing all soils on site with concentrations up to 50 ppm of PCBs, and then removing hot spots of PCB concentrations over 10 ppm where "cost effective."(19) The remedy also calls for grading and filling the site, dumping excavated soils in an EPA approved landfill offsite, and capping the soil with a clay cap.(20) No institutional controls were mentioned in the ROD. During the public hearings before the ROD was signed, the subjects of how complete the soil removal should be and of future land use were brought up by citizens who wanted all soils above 10 ppm PCBs removed from the site: "EPA can not give us any written guarantees about our future, and we are intelligent enough not to ask for any,.. but there is such a thing as preventive measures, and this is all we are asking for,"(21) and, "Remove the price tag from our heads and allow us to return to our lives on an almost normal basis again - for we can never go back to the happy-go-lucky people we once were."(22)

Not long after the ROD was signed, Region III discovered a buyer was interested in purchasing the site and had plans for an unknown development there. Region III queried EPA headquarters on what restrictions they were authorized to impose on future land use at the site to protect the integrity of the clay cap. In his reponse to Region III, Hazardous Waste Branch Chief Neil Wise concluded that the federal government had no authority to restrict the land use of a private property owner, but added that CERCLA liability could be incurred by anyone who damaged the site remedy - an after-the-fact dissuasion. The text of Wise's response follows, and is applicable to similar sites:

> Although there are no provisions in CERCLA or SARA for such restrictions once a site has been remediated, the integrity of any cap or other "permanent" installation can and should be ensured by the O & M responsibilities of the state.
>
> Land use is typically a local zoning matter. CERCLA is a remedial authority; the government can spend money to protect public health and the environment, but we do not have the authority to restrict land use once our work is done. Of course, any user of the land who interferes with the remedy, e.g. disturbing the clay cap, could incur both civil tort and CERCLA liability to remedy the situation.
>
> As for the Lehigh Electric site, the federal government has no control over the sale of such site.

> Speculation over potential use or activities at the site is insufficient justification to interfere. A purchaser should, however, be on notice of the past problems and remedies. Future owners are more likely to have notice of the remedial action if the state or local government records the remedial action on the deed to the property.(23)

A similar situation has arisen at the Combe Fill North Landfill site in Mount Olive township, New Jersey. The former 65-acre landfill was capped, and no institutional controls were set forth in the ROD. According to Edgar Kaup of the NJDEP, a developer is now interested in buying the site once it has been cleaned up and capped, and then putting a golf course on it. Kaup added that there is no legal means he knows of to prevent this. During the public hearing before the Combe Fill North ROD was issued, residents expressed worries about the future use of the site.

Resident: "Is there a possibility that this landfill will be opened again?"

NJDEP representative: "I don't think that someone is going to recommend opening a National Priorities List site that we are basically closing. However, there is no guarantee that this will not happen sometime in the future. I tend to think that it will not happen."(24)

At the Friedman Property in Upper Freehold township, New Jersey, the ROD did recommend deed restrictions to prevent onsite excavation, agricultural use and residential use. However, the site was delisted from the National Priority List and the institutional controls were never implemented, stated EPA Region II project manager Tom Uzzo. The site, a former waste dump, is vulnerable to redevelopment because it is located in a popular resort area with growth pressure, said Edward Putnam with the NJDEP Water Resources Division. Putnam said a fence now surrounds the property, but hot dog vendors have parked their carts outside the fence to catch passersby en route to a local beach and an amusement park. Putnam added he understood that if a new owner tried to build anything on the dump site, the owner would need a disruption permit from the state to do any excavation work. This way the state could safeguard the site by denying a permit, he said.

At the Seymour site in Indiana, federal, state and local officials have worked together to fashion a detailed list of land-use restrictions designed to safeguard the mixed-media cap remedy. The extensive range of institutional controls, outlined in seven pages of a draft consent decree expected to be signed in September, 1988, includes restrictions on all residential or commercial uses that would allow the continued presence of people; restrictions on all uses of the site that would cause exposure of people or animals to contaminated groundwater; and detailed instructions on how long the controls are to remain in place, who has the authority to oversee them, and monitoring procedures and responsibilities (see Appendix A). The Seymour consent decree could serve as a good model for controlling future land use at similar sites with containment remedies or unresolved groundwater contamination.

CASE 4. RESISTENCE FROM LOCAL GOVERNMENT

GE Moreau Site/ Krysowaty Farm

In the preceding cases, institutional controls either worked or didn't work for a variety of reasons, but gaining the cooperation of state and local governments was never an issue. In the GE Moreau case, efforts to bring in an alternate water source have been stymied for four years because of a dispute over the best way to bring in alternate water. The importance of gaining the support of the local government is highlighted in this case because the town has the sole authority to create a water district and allow the installation of new water lines in town. In other cases, local officials have the unilateral authority to enact ordinances to close private wells, or to prevent drilling of any new wells. Local governments are also important conduits to the general public in a Superfund site area, and can do a great deal to galvanize public sentiment in favor of or against an institutional control proposed by the state, EPA or a responsible party.

The GE site is an industrial waste disposal site located in Moreau, N.Y. and surrounded by residences on private wells. Between 1958 and 1968, GE disposed of 452 tons of waste materials, including TCE, PCBs, spent solvents, oils and sludge.(25) When concentrations of TCE were discovered in the groundwater below the site, the town installed well-water filters in 70 homes downgradient of the site. Remediation outlined in the ROD includes use of an existing cutoff wall around the site to contain groundwater flow, airstripping to remove surface-water volatile chemicals, removal of 8,600 cubic yards of PCB-contaminated soil with onsite disposal, capping the site and alternate water to 100 homes.(26) Institutional controls are listed as restrictions on groundwater removal and alternate water lines.

A dispute over bringing in alternate water arose when Moreau supervisor R. Gardner Congdon and other town officials decided EPA hadn't included enough homes in the ROD to receive alternate water. Congdon, who had the town conduct its own well tests, estimates there are currently 350 to 400 homes in Moreau that have contaminated well water or face a threat of contamination from plume movement. Moreau also has fought the ROD provision that the town buy its water from neighboring South Glens Falls, arguing that South Glens Falls' water supply is barely adequate for its own needs and would not be able to meet Moreau's expanding needs. Town officials are also hoping that EPA remediation will provide them with an expanded water supply for future town growth - at EPA expense, according to EPA officials. Moreau has proposed joining a regional water district with a larger water supply, but the state and EPA have refused to pay the additional cost, said Congdon.

Finally, Moreau officials said they must consider the consequences of bringing in a public water supply to a small-town, rural area and want the settlement to ensure that the town has enough provision for future water-supply hookups to accommodate the growth likely to result from the new water lines.

Mel Hauptman, EPA Region II section chief who is overseeing the GE Moreau site, said the federal government is powerless to implement an institutional control restricting withdrawal of contaminated groundwater on private land - although recommended in the ROD - because it lacks the authority. "This concept of control is only on paper. We have no legal authority to do anything," stated an EPA staff member familiar with the case. Hauptman said the publicity surrounding the discovery of contaminated groundwater has made future well-drilling in the vicinity a non-issue. As for Congdon's contentions over the alternate water supply, Hauptman defended EPA's well testing and recommendations for bringing water to 100 homes. He said Moreau's projections of 350-400 homes needing alternate water were based on political boundary considerations, not on chemistry. He added that EPA was not in the business of financing the future growth of a town, only in cleaning up hazardous wastes threatening human health and the environment.

Leo Collins, manager for environmental programs with GE, said the debate between Moreau, GE, EPA and New York State involved access issues as well. Collins said GE was forced to buy a property adjacent to the waste-disposal site because it needed access to the property to clean up a PCB-contaminated driveway there. An institutional control such as an easement agreement with the neighbor would have made the proceedure easier, said Collins, who said GE was eventually required to buy the site. The owner, a Mr. Lewis, had notified the town and the state he intended to develop his property into a resort, said Collins. Congdon said the town put Lewis up to the proposal as a way of forcing GE's hand to buy and clean up the property. GE eventually bought the property from Lewis for $80,000, acknowledged Collins, who added that Lewis is now suing GE for ill health effects he alleges he has incurred from the contamination. Moreau is also currently suing EPA and GE, and EPA has countered with a threat of court action if Moreau continues to withhold its permission to bring in alternate water lines.

In the case of the Krysowaty Farm site in New Jersey, local officials have reacted to an unpopular institutional control with lax enforcement instead of head-on resistance. Deed restrictions preventing future development of the site were included in the ROD to prevent the use of contaminated groundwater left after site remediation. According to EPA Region II project manager Richard Schwartz, local officials have been reluctant to enact or enforce deed restrictions at the site because it would preclude future land development and ensuing revenues. "Towns don't like enforcing this because it means they lose tax revenues. This is a very tough one to enforce," said an EPA official in the region.

CASE 5. UNCLEAR ENFORCEMENT ROLES

Marathon Battery Site/ Suffern Village Well Field

Sometimes institutional controls run into implementation or enforcement problems even when they are spelled out explicitly in RODs, because responsibility for their maintenance is never determined. In some cases, such as the Marathon Battery site, EPA had the state in mind as the party responsible for implementing institutional controls, but the state felt it possessed no such authority, and refused. At the Suffern Village Well Field site, town officials had one conception of what institutional controls were in place, and town employees responsible for active monitoring of the groundwater had another idea. There is even disagreement within EPA from region to region regarding what authority the agency possesses to implement various controls. Determining whether an institutional control is legally enforceable, by whom, and then assigning that party responsibility for seeing that the control is implementedsuccessfully, and finally formalizing these decisions as part of the ROD, would go a long way toward preventing institutional controls from falling through the cracks.

The Marathon Battery site in Cold Spring, New York, includes two marshes contaminated over many years by hazardous wastes from industrial discharges. Contaminants include cadmium, cobalt and nickel.(27) Extensive sediment dredging, removal and treatment was the recommended action for one marsh, while no action with long-term monitoring, a public awareness program and site access restrictions was the remediation for the second, Constitution Marsh.(28) Institutional controls for Constitution Marsh were cited as: "Site access restrictions will include limitations on fishing and water sports, and the installation of fencing."(29)

When the Marathon Battery ROD was issued in September, 1986, fences were still considered to be a standard institutional control. Since 1987, however, EPA guidance documents have considered fences outside the definition of non-engineering or legal controls. At Marathon, fences were clearly envisioned as an important means to prevent access to Constitution Marsh by boaters and fishermen. EPA Region II project manager Magalie Beausejour said a chain-link fence was put up around the marsh to prevent public access, but no follow-up has been conducted to see if it is still up or still intact. She added that warning signs planned for the fence were never put up. EPA had considered at one point hiring a full-time security person to keep people out of the marsh, but decided it would be too expensive. Beausejour added that the state has made several attempts to warn local residents away from using the marsh, as sediments and surface waters remain contaminated, but a planned public information meeting has not yet materialized.

State Department of Environmental Conservation (DEC) staff member Scott Rodabough said the state has the authority to ban swimming in areas of known surface-water contamination. The state currently has a ban in place on swimming in the polluted Hudson River not far from Constitution Marsh. But Rodabough said the state did not consider itself empowered to restrict development or well-drilling in areas overlying the contaminated aquifer that lie outside the Superfund site. "We have a big question on what EPA meant by 'institutional controls,'" stated one state official familiar with the site. "We don't feel we have any right to prevent people from developing that aquifer." The official added that development pressure is great in the Cold Spring area, and that the town is currently looking for a new water source to supply its fire department's needs. Rodabough said he would like to see more guidance on the use and authority for institutional controls, both from EPA and from the state. Both state and federal officials acknowledged that they were aware that residents still use the marsh for fishing and recreation, and that better controls are needed to prevent access to the contaminated site.

At Suffern Village, New York, monitoring detected elevated levels of trichloroethane (TCEA) in the town's four municipal wells, contamination traced back to a local thermostat manufacturer. The ROD recommended no action, allowing the wells to subside to background contamination levels over time, and suggested implementing site access restrictions.(30) Town superintendent of Public Works Donald Grasso said the village has not taken any action to implement institutional controls such as a restriction on drilling new wells. He explained that most of the contaminated aquifer lies outside town boundaries on private land. "I can't restrict anything outside my boundaries," he explained. Grasso added that continuous pumping of town wells to purge them of contaminants has exacerbated local drought conditions, and may jeopardize private wells in the area. Grasso added he had received no input from the state or from EPA on implementing suggested institutional controls.

EPA Region II project manager Richard Kaplan said EPA did put up a fence to restrict site access to the well field, and did recommend to the town not to allow drilling into the area of plume contamination. DEC's James Quinn said site restrictions were never pressed by the state because by the time the study of the aquifer contamination was completed, TCEA levels had already attenuated to safe levels. Since that time, a new source of TCEA contamination has appeared in one of the town wells and has been traced to a long-defunct coal gasification plant. That well has now been shut for purging treatment.

Some town officials said that surrounding Rockland County has the statutory ability to prevent new drilling into contaminated groundwater, and added they knew of no new wells drilled in the area since the contamination was discovered. Town workers monitoring the Suffern municipal wells, however, were under the impression that the town itself had "something on the books" that would prevent drilling of new wells in the contaminated aquifer. In either case, the issue of a new well has not been raised since the Superfund site discovery.

CASE 6. WHEN TO IMPLEMENT INSTITUTIONAL CONTROLS
Industriplex Site/ Picillo Farms, R.I./ ReSolve, MA / Powersville Landfill Site, GA

The question of when to implement institutional controls ata Superfund site is a critical one, and depends to a large degreeon the type of site and type of institutional control involved.The EPA draft guidance document divides controls into short-term,interim-action, and long-term controls. If the remedy willrestore site contamination to health-based levels relatively quickly, short-term controls are called for, the draft argues. If the remedy will not quickly restore the site to where it is safe for human habitation or groundwater consumption, the draft recommends long-term controls. In many cases, however, two or three years may pass between contamination discovery and selecting a final remedy, years in which restricting access can be critical but where institutional controls are rarely applied. At the Industriplex site, private industries continue to operate in the midst of a residually contaminated site; workers come and go and residents have easy access to the site while negotiations over a consent decree continue. In other cases, controls are deferred until the remedial design phase, or left up to the responsible party to enact.

Industriplex is a 245-acre industrial park in Woburn, MA, where a century of diverse manufacturing and waste disposal practices have left wetlands, ponds, soil, sediments and groundwater contaminated with volatile organics and toxic metals.(31) Today, about 20 industries still operate on the site. Cleanup action includes pumping and treating contaminated groundwater "hot spots," capture and treatment of gaseous emissions, capping contaminated soils and sludges, and institutional controls, outlined as "possible modification of the City of Woburn's zoning regulations and use of state authority to further assist in the control and future use of the affected properties."(32)

So far, no institutional controls have been implemented at the site. Workers at the industrial park have access throughout the developed portion of the site, and neighborhood residents use undeveloped portions of the site for dirt-bike riding and berry-picking. Areas currently not in commercial use where background levels of contaminants exceed allowable limits have been fenced and posted with warning signs, said EPA Region 1 project manager Marilyn Wade, but neighbors continue to use these areas for recreation. Wade said institutional controls have not been considered a priority while negotiations continue with the responsible parties over a consent decree. She said controls would probably be mentioned in the consent decree, which in draft form now states that the responsible parties are the ones who have to come up with institutional controls for the site. Any institutional controls that are implemented will probably not prohibit future land development, at least in areas where contamination levels are below action levels, predicted Wade. She said she did not believe EPA or the state had the authority to restrict development on private lands that were not contaminated to action levels. "We're not precluding them (owners/operators) from future expansion necessarily," said an EPA site supervisor. Wade said that EPA and the state are now negotiating for the right to turn down an expansion or new development proposal if it threatens the remedy in any way. EPA also wants the right to enforce industry maintenance of existing structures, since current buildings, driveways, parking lots and sidewalks are all considered "caps" on contaminated soils below, and might expose contaminants if allowed to fall into disrepair. The authority for these controls would come from the consent decree, said Wade. She added that EPA does have the right, under CERCLA liability, to sue if a new development or unmaintained structure damages the integrity of a "cap," but that EPA prefers to have some preventive powers instead of just after-the-fact capabilities.

The Picillo Farm site in Rhode Island presents a similar case of institutional controls defered until negotiations over a consent decree with responsible parties conclude. Emergency removal actions took 10,000 drums of toxic wastes from the site, which lies upgradient from a nearby swamp. Monitoring tests are still trying to determine whether and to what extent the groundwater was contaminated. Susana Cortina, of the Region 1 office of regional counsel, said institutional controls recommended to prevent new well drilling in the area of the suspected plume or between the site and the adjacent swamp have not been implemented yet. "We just haven't dealt with that issue at all," added an EPA representative. Cortina said she assumed that if groundwater contamination was detected, institutional controls might be considered to prevent tapping the aquifer. She said she did not know when they would be brought into the consent decree process or by whom.

At the Re Solve Superfund site in Massachusetts, EPA staff members were equally unresolved about when to bring consideration of institutional controls into the picture. Though remedial action has already been determined, the state, EPA and responsible parties are still locked in negotiations over a consent decree. The final action ROD specifies that "on site institutional groundwater controls will be implemented,"(33) but EPA Region 1 project manager David Lederer said he considered it still too early to worry about implementing such controls. He said EPA hoped to establish a building ban on the property, but was not clear under what authority it could do this. Lederer added they were considering putting up a fence to prevent site access during the projected 10 year treatment period.

The Powersville Landfill site in Peach County, Georgia represents a similar situation in a different region. A remedy calling for clay cap containment of a landfill replete with residual hazardous wastes includes supplemental institutional controls to prevent harm to the cap: "Site deed restrictions will be implemented to prevent any drilling or construction activities that would compromise the integrity of the remedy. Deed restrictions will also be established to prohibit the drilling of water wells in the area between the site and Mule Creek, the area in which ground water is likely to be affected by the landfill."(34)

Such controls, while admirably detailed, fail to indicate who is responsible for their implementation, and when. Region IV project manager Ben Moore said no action has been taken on institutional controls yet because EPA, the state and responsible parties are still awaiting approval from the U.S. Department of Justice on a consent decree. In the mean time, area residents are still using contaminated wells, he said. Site and deed restrictions, and an alternate water supply, will be considered only after the consent decree is finalized and the remedial design phase has begun, said Moore. He added that residents have been advised not to use their wells, but so far not offered any alternate source of water.

CASE 7. A CREATIVE SETTLEMENT

Chisman Creek Site

Sometimes the issue of future land use can be resolved to the satisfaction of all parties through creative use of institutional controls. One of the best examples of this is the case of Chisman Creek. The county, by staying open-minded and cooperative when faced with the discovery of a Superfund site in its midst, came away with three new public parks and recreation areas. The responsible party, while paying heavily for the damage and remedial cleanup, reaped positive publicity from the arrangement.

The Chisman Creek site in York County, Virginia lies in a 520-acre watershed of Chisman Creek, a tributary of Chesapeake Bay. The site is surrounded by residential homes, wetlands, canals and marinas where extensive fishing and boating takes place. The site is owned by Virginia Electric and Power Company, where coal-burning-generated fly ash was dumped into four sand and gravel pits on-site for two decades and resulted in contamination of area soils and sediments, surface waters and ground water, including the waters of the creek.(35) Remediation includes capping contaminated areas with soil caps and vegetation, alternate water to residents with contaminated wells, and "implementation of deed restrictions or other controls to prohibit excavation of soil and restrict onsite building and ground water use."(36)

Through a consent decree fashioned between Virginia Power and EPA a year after the ROD issuance, and a subsequent sale agreement between Virginia Power and York County issued three months later (see Appendix B), the parties in the Chisman Creek case took the recommended institutional controls and implemented them in a way that would turn the capped site into a recreation area where redevelopment of the site would never become an issue.

The terms of the agreement between Virginia Power and York County called for the county to purchase a 13.8-acre parcel of contaminated, privately owned land adjacent the Virginia Power site, and to lease an additional 14.4 acres from Virginia Power for 60 years, to use as public park sites. In return, the county agreed to grant Virginia Power the right of access to the properties so they could lay utility lines and build a waste water treatment plant to carry out their responsibilities in treating contaminated groundwater. Virginia Power also agreed to indemnify and hold the county harmless from all liability that might arise from residual fly ash contamination.

Region III project manager Eric Neuman said the key to negotiating a successful agreement was to exempt the county from all liability that might result from site contamination. Under CERCLA, any former or current owner can incur liability. Neuman added that the agreement restricted any water-line digging in areas already capped. The construction of three planned public parks - including one recreation area with two lighted softball fields, another with three soccer fields, parking and duck ponds, and a third for passive recreation such as nature walks - won't begin until the capping is finished, and won't be permitted to harm the caps, said York County Parks and Recreation Director Robert Kraus.

As part of the consent decree, all residents in the area with contaminated or potentially contaminated wells are to be hooked up to a public water supply. Under the agreement, Virginia Power will pay for the water lines and all resident hook-ups. County officials said they ran into familar problems with trying to close existing wells in the area, reporting that some residents did not want to switch to public water or seal their wells and lose the option of using well water for lawn watering. Kraus stated that restricting access to the contaminated waters of Chisman Creek has also eluded officials. Residents continue to use the creek for fishing and crabbing, said Kraus, who added there was really no way to keep people out of such a large area.

He said local health officials were not particularly concerned about the access to Chisman Creek because it is not considered a serious health hazard any more.

Kraus said the listing of the Chisman Creek site on the National Priority List originally caused widespread fear and anger toward Virginia Power. Now residents are looking forward to getting new parks, and to seeing the area waters cleaned up, he added. "We feel very comfortable with this as a model site," concurred Neuman.

CASE 8. USING LOCAL INITIATIVE

Lees Lane Landfill

Institutional controls are always easier to implement and enforce if local governments are committed to making them work. At the Lees Lane Landfill site in Kentucky, county government officials not only cooperated, but went well beyond the ROD recommendations and instituted their own controls that helped to alleviate an extensive groundwater and methane contamination situation.

Methane explosions in basements of area residents alerted officials to problems at the Lees Lane Landfill in Jefferson County, Kentucky adjacent the Ohio River. The porous substrate of the area had been riddled with seepage pits for many years, and contaminants from the landfill (including methane) as well as septic effluent and household wastes had spread throughout the residential area. Hazardous wastes in the landfill contaminated site surface water, groundwater and soil with benzene, heavy metals and inorganic compounds.(37) Remediation outlined in the ROD includes a gas collection system, capping soil "hot spots," removing exposed drums, planning for groundwater cleanup, and institutional controls "to be fully identified during remedial design may include, but will not be limited to, cautionary signs and the installation of a gate at the Putnam Street access point."(38)

EPA Region IV project manager Beverly Houston said contractors did put up warning signs and a gate soon after the ROD was issued to keep people out of the landfill site. Houston said signs were put up twice and shot down by local residents each time. She said deliberations with the state over O & M responsibilities have not yet resolved whether more signs will be put up at the site. The gate, she conceded, has not been keeping people out of the site, but does prevent them from driving in. The landfill is still a popular dump site for trash and old appliances, a common fate of many Superfund sites.

Houston said EPA did not consider implementing any further controls because the county already had an existing ordinance restricting well drilling. Jefferson County Health Department official Dennis Weylan said the ordinance, restricting all well drilling within 1,000 feet of a landfill, had come about because of recurring problems with the Lees Lane Landfill. When the methane problem was discovered, however, the county decided to expand the ordinance to ban all future well drilling in the county. Weylan explained that the contamination was so pervasive and the substrate so porous and interconnected with underground rivers, caves and the Ohio River watershed that there was no way to prevent contaminated groundwater from spreading throughout a large area.

Weylan conceded that there was not much the county could do about closing existing wells, but said the county had initiated a program to test area wells on request of residents. Residents concerned with the quality of their well water can pay the county to come out and test their well. If contamination is evident, the county will disinfect the well and adjoining piping, and test it again. If contamination is still present, the county adds chlorine to the well, said Weylan. While the county cannot presently force a resident to seal a contaminated well, it does try to persuade the resident to switch to a public water supply.

The county has also enacted an ordinance that bans the use of roof cisterns. Weylan said he became concerned that acid rain and widespread use of pesticides in the county might contaminate rain water, particularly as it ran down roofs and incorporated dry-precipitation contaminants as well. New homes built in the county are now prevented from installing cisterns on the roof. Existing cisterns are permitted if they are supplied with city water. Weylan said the county drew its authority to enact these ordinances from its mandate to protect public health. He added he was aware of no legal challenges to date on the ordinances.

CASE 9. PROS AND CONS OF RELYING ON PRE-EXISTING CONTROLS
Biscayne Aquifer/ West Virginia Ordnance

Not all sites require the creation of institutional controls from scratch, such as a new local ordinance. In some cases, there are pre-existing controls that can be applied directly or adapted to fit the remediation requirements of a Superfund site. There is an implicit danger, however, in using pre-existing controls. While easier than enacting new legislation, the control may not be tailored to the exact situation at a Superfund site. This is a concern particularly when the control plays a central role in the remedy.

At the West Virginia Ordnance site, environmental officials designing the remedy relied on a pre-existing control that resulted in an incomplete remedy. At the Biscayne Aquifer sites, on the other hand, federal officials worked closely with the local government to fine-tune a new county aquifer-protection ordinance to supplement groundwater protection at the Superfund sites. By enacting their own version of a successful local control, remedy designers at Biscayne gained local support while avoiding the pitfall of allowing an existing control to dictate the remedy.

A. BISCAYNE AQUIFER SITES

Three distinct National Priority List sites in north Dade County, Florida - the Varsol Spill site, Miami Drum, and 58th Street Landfill - together comprise the Biscayne Aquifer sites. The sites were discovered contaminating a common aquifer that represents the sole source of drinking water for three million people.(39) The four-phase cleanup outlined in the September, 1985 ROD devoted one phase each to the three sites and a fourth to fashioning a groundwater cleanup remedy for the aquifer.(40) In addition to pumping and air-strip treating the groundwater through existing municipal wells, the ROD called for county-managed controls on well drilling and operating, and on wastes produced and disposed of by small industries and homeowners.(41) Julie Baker, with Dade County's Department of Environmental Preservation and Management, said the county's Well Field Protection Plan of 1981 was the prototype for EPA's subsequent groundwater-restriction recommendations known as the Biscayne Aquifer Protection Plan. Baker said the county passed an ordinance, following evidence of aquifer contamination, to restrict the kinds of industries that could operate within the boundaries and recharge areas of the aquifer. This included restrictions on new gas stations, dry cleaners, vehicle maintenance firms and wastewater treatment plants. In addition, the county legislation set housing-density limits, with lower densities for new homes coming in with septic systems and higher densities for sewered homes. Restrictions on laying fuel-carrying pipelines, on building new well fields, and regulations governing the design of storm drains were also enacted by the county to protect the shallow, sand-capped aquifer.

An extensive set of regulations governing private wells developed in the Well Field Protection Plan ventured aggressively into the often-sacrosanct realm of pre-existing water rights. The county ordained that any resident whose property is abutted by a water line must connect to it. Those who remain on private wells in areas without water lines must case and grout their wells and provide a protective cap to prevent contamination from entering the wells and the aquifer below. The county is currently working on new legislation to regulate the thousands of agricultural wells sunk within its borders, said Baker.

When EPA first began remedial pumping and treatment of the contaminated Biscayne Aquifer in 1983, staff members worked with the county to devise similar institutional controls for the three Superfund sites. Baker said EPA could count on the county to enforce its Biscayne Aquifer site controls. Dade County has hired county pollution control inspectors authorized to prosecute code violations, and an appointed judicial special master to expedite criminal and civil code-violation hearings. Baker said the regulatory overlap between county and EPA groundwater ordinances was not a hindrance but an extra layer of defense in protecting the Biscayne Aquifer.

EPA Region IV project manager Jim Orban, who worked with Dade County in designing the Biscayne Aquifer Protection Plan, said he amended the basic design of the county plan and got neighboring counties containing portions of the aquifer to adopt similar legislation. Orban said EPA provided financial resources, guidance and legislative recommendations to the counties while allowing them the flexibility to draft their own ordinances designed to address local concerns.

"They (counties) are the closest to the problem. They're not blind. If you just give them half a chance, they come up with some pretty good ideas," said an EPA staff member. Orban said the EPA plan for the three Superfund sites incorporated many of Dade County's aquifer protection features, and organized them into immediate-implementation, short-term, and future-land-use control recommendations. The plan also addressed areas not then covered by federal regulations, such as recommended restrictions on hauling and handling of hazardous wastes from small generators, and guidelines calling for replacements of ineffective force mains and leaking sewer pipes.

B. WEST VIRGINIA ORDNANCE SITE

The West Virginia Ordnance site is a large, 8,323-acre tract in rural W. Va. used during WWII by the U.S. Army for manufacturing explosives. After 1945, the ordnance was shut down, pockets of undeveloped land within the site were sold to private landowners, and the vast majority of the site was deeded to the state of W. Va. with contract stipulations. Because the ordnance works had contaminated a large portion of the site with TNT and its byproducts, including soils, utility lines, pond surface waters and sediments and a shallow aquifer underlying the manufacturing compound, this area was deeded to the state on condition that it remain a wildlife park (McClintock Wildlife

Station) in perpetuity, exluding any human habitation.(42) Remediation outlined in the ROD includes burning off residual TNT, covering contaminated soils with a soil cap, excavating, flushing and backfilling reactive utility lines and trenches, disposal of asbestos and a wetlands assessment.(43) Institutional Controls reference the 1945 contract agreement between the federal government and the state: "Deed restrictions will prevent private use of McClintock Wildlife Station. The state of West Virginia has authority to maintain the land as a wildlife preserve."(44)

By restricting human habitation on the contaminated site, the remedy was designed to prevent any human exposure to residual contaminants - the idea behind an institutional control. Humans do use the site, however. A wildlife park manager lives in a house on the site year-round, and park employees as well as recreational hunters and fishermen spend full days on the site. But EPA officials say comprehensive toxicity tests conducted in 1981 revealed that the level of the residual toxicity was too small to pose any threat to these people. McClintock Wildlife manager Robert Miles said the park receives 10,000 visitors each year, primarily hunters and fishermen. Although no overnight camping is permitted, visitors are allowed in the park from sunup to sundown, and many hunters and fishermen do put in a full day of recreation at the site, he added.

EPA site manager Hector Abreu-Cintron said that the agency began a series of elaborate toxicity tests on the site after W. Va. Ordnance was placed on the Superfund priority list in 1981. To avoid killing game animals through autopsy testing, EPA devised a way to estimate probable accumulation of toxics up through the food chain by testing soil toxicity. By calculating what percentage of a known toxic in the soil would be taken up by plants, and further concentrated by the eating habits of herbivors and again by carnivors, researchers were able to set limits on how much soil toxicity would be necessary to produce a deer or waterfowl toxic to humans. Abreu-Cintron said the levels of toxicity in the soil were many orders of magnitude smaller than what would be necessary to create game species toxic to the hunters and fishermen who ate them. As a result, there are no restrictions on consuming any fish or game taken from the park, added Miles. W. Va. Department of Natural Resources' Pam Hayes said bioaccumulation of toxins in fish has been a longstanding concern of the state's. She said joint state/EPA tests revealed fish with contamination levels in their tissue at one pond and several reservoirs within the park. Those ponds have since been closed and backfilled, said Abreu-Cintron.

There is also the open question of whether the limited cleanup of the site in combination with land-use restrictions obeys the EPA mandate to protect human health and the environment.

Another concern of state officials is possible contamination of private lands within the original ordnance tract. The U.S. Department of Defense (DOD) is currently in the process of negotiating with private landowners to buy out their properties. Abreu-Cintron said a second area of contamination on the tract has turned up on the property of a private owner, who is apparently amenable to selling. He said the DOD plans to buy the property and deed it to the state with restrictions on future human habitation. Abreu-Cintron and others have acknowledged that the idea of buying up private land to prevent human access, instead of cleaning up the site to remove all contamination, was not an ideal remedy. "It's not the way we like to do things necessarily. But in this case, we trust the state to not allow future development," said one EPA official, who added that in the case of a privately owned site, EPA would probably not rely on such a control. Abreu-Cintron said that the existance of pre-existing institutional controls had helped to guide the outcome of the remedy.

CASE 10. FEDERAL OWNERSHIP RIGHTS AND PERMANENCE ISSUES - ARE INSTITUTIONAL CONTROLS LEGAL?

Rocky Mountain Arsenal

The evolving consent decree between the United States and Shell Oil Co. over the Rocky Mountain Arsenal site in Colorado offers a glimpse of how institutional controls are hammered out between fractious negotiating parties. The latest draft consent decree(45) and accompanying U.S. responses to comments received on the proposed decree(46) provide a lively dialogue on some of the most fundamental issues surrounding the use and legitimacy of institutional controls. On one side is the U.S. government, owner of the site and leaser to Shell Oil. In addition to technical cleanup provisions, the government has proposed extensive land-use restrictions for the site. On the other side are the State of Colorado, Adams County, the City of Denver, and various environmental and development organizations who favor a more complete technical remedy that would preclude the need for controls on future land use. The following is a brief summary of the controls recommended in the draft consent decree, and both sides' arguments on a number of different issues surrounding the use of these controls.

The Arsenal site was operated by the U.S. Army during WWII for manufacturing chemicals and explosives for war. Later the Army leased a portion of the site to Shell Oil and others for chemical manufacturing. The highly developed area surrounding the site near Denver has experienced contamination of public drinking wells by Arsenal-site organic solvents, including TCE and PCE.(47) Vinyl chloride and semi- and non-volatile organic compounds found in area groundwater believed to originate from the site also pose threats to the local public drinking supply.(48) The June, 1987 ROD outlines remediation as the construction of a granular activated carbon water treatment system and, if warranted, air-strip treatment of groundwater, but includes no mention of institutional controls.(49) In the draft consent decree between the U.S. and Shell, however, the U.S. proposes supplementing any technological remedies chosen in the remedial design phase with a series of institutional controls it outlines in the draft in detail:

* No residential development allowed on the Arsenal site.

* No use of any site groundwater or surface water for drinking.

* No consumption of any fish or game taken from the site, though non-consumptive uses could be allowed, with restrictions.

* No agricultural use of the site, including raising livestock, crops or vegetables. Erosion control would be allowed as part of the remedy.

* Protection of wildlife habitat to safeguard endangered species, migratory birds and bald eagles in particular.(50)

The proposed decree also grants the U.S. the option to enact future site-use restrictions on a temporary or permanent basis provided they adhere to CERCLA requirements, including measures designed to further protect human health and the environment, or measures to aid a response action.

Reaction to the institutional controls outlined in the draft from the state, county, city and non-governmental parties has been largely negative. Many of these objections stem from the basic premise that the use of institutional controls allows the U.S. and Shell to develop a cheaper, less-permanent remedy for the site. The range of objections to the draft's institutional controls outlined in the U.S. response-to-comments document can be generalized as follows:

1) Institutional controls preclude a complete, permanent cleanup of the site, as required by SARA (where "practicable");

2) Federal ownership, while not in dispute, does not give the U.S. the right to implement any site-use controls it wishes;

3) Institutional controls do not appear in any Superfund or other federal statutes, run counter to the mandated permanent-remedy preferences of SARA, and are therefore illegal;

4) Controls should be implemented only after all technical remedy design work is completed, if at all;

5) Continued land use should be the goal of remediation, and therefore future land uses should not be restricted once remediation is completed.

The first issue, that of institutional controls as sabotaging any chance of a permanent remedy, is at the heart of much of the controversy over institutional controls and has application to almost any site at which long-term controls are used. Adams County argues: "(Use) restrictions insure that the Arsenal never will be properly cleaned up...it is clear that the Army and Shell are seeking nothing more than to condemn the Arsenal to become a permanent landfill."(51) The County concludes by arguing that the controls "virtually will insure that the public health of the citizens of Adams County will be endangered, and the environment permanently, perhaps irreversibly, compromised."(52) The Environmental Defense Fund (EDF), in a less impassioned voice, argues that "land use restrictions are inappropriate for protecting the public and the environment from long-lived and highly toxic substances."(53) The State emphasizes the unreliability of legal controls compared to the permanent removal of contamination: "the selection of a remedial action on this basis would unacceptably rely upon, for the protection of human health and the environment, a set of man-made rules (i.e. use restrictions) instead of a level of cleanup which is adequately protective as required by CERCLA."(54)

The U.S. government, in its reply, argues that institutional controls are legitimate and necessary as an additional layer of protection in a situation where no amount of technological remediation can achieve a site that is 100 percent "clean": "...no matter how comprehensive the Arsenal cleanup may be, some residual contamination is likely to remain in Arsenal soils and groundwater. Current limits on our scientific knowledge and cleanup capabilities dictate that certain pathways of human exposure to that residual contamination should be restricted...The use restrictions listed in Section XXIII of the Decree are meant to provide an extra margin of safety by assuring that no such exposures occur."(55)

The U.S. emphasizes it has not slighted technological remediation in any way: "the use restrictions in the Decree will be in addition to what will surely be the largest and costliest environmental restoration program in the Nation's history."(56)

In a second issue, the state argues that the U.S. has no right to dictate the use of institutional controls simply by virtue of owning the site. Colorado also claims preemptive rights over the use of all water within its borders.

In its response, the U.S. asserts its rights to use what controls it wishes as property owner: "It is beyond dispute that the United States, as owner of the land, has the right to decide how to use Arsenal property. The State does not object to, and presumably does not disagree, that the United States' ownership rights carry with them the right to restrict residential development on the Arsenal, to restrict consumption of fish and game taken on the Arsenal, to protect wildlife habitats and to restrict agricultural use. The United States also believes that it is also beyond dispute that the federal government's ownership interest in the Arsenal carries with it the right to prohibit access to the Arsenal and to regulate the conduct of persons coming onto the Arsenal."(57) The U.S. goes on to argue that it views surface and groundwater use restrictions as a natural extension of its ability to regulate the conduct of persons on Arsenal property. The U.S. government's ownership rights argument raises the issue of setting a dangerous precedent for private owners, who may wish to dictate institutional controls or deny them based on ownership privileges.

The question of the legality of institutional controls is raised by all objecting parties in the comments-and-responses document. Colorado rests its case on the primacy of its water rights. The county argues that perpetual land-use restrictions are "legally indefensible under CERCLA." EDF and others argue that the aim of Congress in enacting SARA "was to mandate permanent cleanup at all sites where CERCLA authority is excercized,"(58) and that this call for permanent remedies automatically precludes long-term use restrictions.

In its response, the U.S. argues that the language in SARA expresses a "preference" for permanent remedies, not a "mandate." The U.S. also argues that as long as technological treatment is the "principal element" of any remedy, it has adhered to CERCLA and SARA requirements. "Although the final remedial decision has not yet been made, there can be little doubt that a principal element of that remedy will be treatment that permanently reduces the volume, toxicity or mobility of contaminants at the Arsenal."(59)

The U.S. addresses charges leveled against it that institutional controls are not spelled out anywhere in CERCLA or other environmental statutes, and thus illegal, by arguing that the intent to use them is evident from a close reading of the CERCLA statute; "A careful review of Section 121(d), entitled 'Degree of Cleanup,' suggests that Congress intended CERCLA decisionmakers to consider use restrictions and other institutional controls when planning remedial measures for CERCLA sites."(60) The U.S. goes on to cite a number of internal EPA guidance documents on remediation and public health as supporting evidence for the recurring and legitimate use of institutional controls.

The question of when institutional controls should be brought into consideration in a remediation action or a consent decree has direct bearing on the issue of remedy permanence. The state, county and others commenting on the draft consent decree argue that identifying controls before technological remedies have been selected can subvert the motivation for permanent cleanup remedies. In its response, the U.S. argues that time is of the essence in preventing continued human exposures to contamination at a site, and that that should not have to wait for a thorough evaluation of all land-use restriction options:

"We believe such an exercise makes little sense from a practical standpoint, and certainly does not justify the cleanup delay that such an approach would produce."(61)

While both sides' arguments have merit, it is not clear that they must be mutually exclusive. The idea that access should be restricted as soon as possible to prevent human exposure to contamination while the lengthy RI/FS, remedial design and protracted consent decree processes linger on is a good one. The idea that establishing long-term controls before remedial design work is complete would have an undermining effect on the technical remedies chosen is also worthy. If site-use controls were installed as purely temporary measures until permanent, technical remedies were designed, and then reevaluated after the remedy for consideration of continued use, both sides might be accommodated.

The last general argument put forth by detractors of the consent decree involves the issue of future land use. An odd consortium of interests, including a group of developers interested in reuse of the site and a group of environmentalists interested in complete restoration of the site, argue that CERCLA mandates that Superfund remediation must restore a site to its most beneficial use. Multiple long-term restrictions on site use fly in the face of this mandate, they argue. The U.S. response acknowledges an understanding of this mandate, and promises to fulfill that mandate through the consent decree, but does not explain how it possibly can, given the extensive set of institutional controls it has outlined in the decree:

"the United States is comitted by the terms of this settlement agreement to assure that the cleanup is fully protective of human health and the environment, meets all applicable State and federal environmental law standards, and will be extensive enough to permit a broad range of public uses, including recreational, parkland, open space, industrial and commercial uses."(62) It is not clear how the U.S. intends to do this, given the constraints of its consent decree. The detractors have a good point.

V. RECOMMENDATIONS

To be used to best effect, institutional controls must be brought out of the shadows of internal policy drafts and granted a formal procedure for their design, implementation and enforcement. Through better circulation of information on how specific controls have worked at specific sites, bad institutional controls can be weeded out gradually and good controls adopted or expanded by future participants. The controversial aspects of these controls will not necessarily disappear, because it is not the presence of the controls themselves but the absence of a completely site-restoring remedy that is ultimately controversial. As long as there are sites that are left with residual contamination, there will be a need for institutional controls to prevent harmful levels of exposure to the environment and to people. And as long as there are institutional controls, they must be well-defined, used discriminately, and consistently enforced to make them effective.

The following recommendations are offered as guides toward improving the current selection process and effectiveness of institutional controls.

1) A formal procedure should be established for the design, implementation and enforcement of institutional controls. This would include studying existing local and state controls, reviewing precedents for controls at similar sites and considering new legislation. The prioritization and selection of institutional controls could follow the same pattern that exists for technical remedies, but should not necessarily follow the same time table. Where controls will be used to supplement a technical remedy, they can and should be decided along with the technical remedy. Where controls are intended to be short-term means to prevent exposure and access to harmful contaminants, they should be implemented as soon as possible.

2) Institutional controls should be outlined in more detail in the RODs, including:

a. Who is responsible for implementing them
b. By what date they should be implemented
c. How long they will remain in place
d. Who is responsible for enforcing, monitoring them

3) To expedite bringing in alternate water, money from the Superfund should be set aside to use for paying for resident hook-ups and creation of new or regional water districts, as well as for new water lines.

4) Make controls more palatable to local communities and residents (without compromising safety or the remedy) both to avoid resistance and to ensure better enforcement of the controls, by working closely with communities. Small expenditures for inconveniencing residents, guaranteed indemnification - if possible - and less alarming well-restriction-area notices are examples of ways to smooth objections to institutional controls.

5) Shore-up policy on fences and physical site-access restrictions, including better monitoring, to safeguard against harmful exposure to contaminants at Superfund sites. Many fences currently in place at sites are not preventing access.

6) Don't leave institutional controls consideration until the remedial design phase; by then a critical period of necessary access restriction is already past.

7) Responsible parties and others with vested interests in seeing controls fail should not be allowed to develop, implement or enforce institutional controls. This should be left to the federal government, states, or other decision processes that can arrive at an objective assessment of the best control to use.

8) If a new local ordinance is enacted as part of a remedy, it should be publicized and made clear to all affected levels of government, residents and businesses. Enforcement agents should be made aware of their responsibilities in enforcing the control, and penalties for non-compliance should be publicized. Too often there are broken links in the chain between those who design institutional controls and those responsible for making them work.

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2. Ibid.

3. The United States' Response to Comments Received on the Proposed Consent Decree Lodged with the United States District Court in United States v. Shell Oil Company; Draft June 3, 1988.
4. EPA; Records of Decision Annual Report, FY '85.

5. Ibid.

6. EPA; Records of Decision Annual Report, FY '86.

7. EPA; Records of Decision Annual Report, FY '87. Note: The decreasing percentage of RODs with institutional controls in 1987 may reflect a general concern among regions following the passage of the SARA amendments in late 1986 that controls run counter to the "permanent" solution mandate of the amendments.

8. EPA, Office of Emergency Response and Remediation; Comments on Draft Guidance, August, 1988.
9. Environmental Law Institute; Preliminary Report: Institutional Groundwater Use Controls in Three Selected States, Feb. 21, 1986.

10. ROD Abstract; Williams Property, First Remedial Action - Final, Sept. 29, 1987.
11. Ibid.

12. Ibid.

13. Well Restriction Areas are zones designated by the New Jersey Department of Environmental Protection's Bureau of Water Supply where the state can restrict new well drilling to prevent drawing of contaminated groundwater. The state had 30 Well Restriction Areas in place as of May, 1988.

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15. Ibid.

16. ROD Abstract, Caldwell Trucking, First Remedial Action, Sept. 25, 1986.
17. Ibid.

18. Record of Decision, Lehigh Electric Site, February, 1983.

19. Ibid.

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21. Ibid.

22. Ibid.

23. Communication between Neil Wise, Region III Hazardous Waste Chief, and Bruce P. Smith, Hazardous Waste Enforcement Branch, dated Dec. 14, 1987.

24. ROD Abstract, Combe Fill North, First Remedial Action - Final, Sept. 29, 1986.
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26. Ibid.

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31. ROD Abstract, Industri-plex, First Remedial Action, Sept. 30, 1986.
32. Ibid.

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34. ROD Abstract, Powersville Landfill, First Remedial Action - Final, Sept. 30, 1987.
35. ROD Abstract, Chisman Creek, First Remedial Action, Sept. 30, 1986.
36. Ibid.

37. ROD Abstract, Lees Lane Landfill, Second Remedial Action - Final, Sept. 25, 1986.
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40. Ibid.

41. Ibid.

42. ROD Abstract, West Virginia Ordnance, First Remedial Action, March 27, 1987.
43. Ibid.

44. Ibid.

45. United States v. Shell Oil Company, Inc., Civil Action No. 83-C-2379, draft Consent Decree; May, 1988.

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50. United States v. Shell Oil Company, Inc., draft Consent Decree.

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52. Ibid.

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54. Ibid.

55. Ibid.

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57. Ibid.

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61. Ibid.

62. Ibid.

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IX KEY CONTACTS

REGION 1

Susana Cortina, EPA Office of Regional Counsel (Picillo Farms)
David Lederer, EPA project manager (Re-Solve, MA)

Marilyn Wade, EPA project manager (Industri-plex, MA)

REGION 2

Magalie Beausejour, EPA project manager (Marathon Battery)

Michael Bennett, New York State Department of Environmental Conservation (DEC), Division of Water Resources

Raymond Chadwick, Jr., Cape May County (N.J.) Health Department
Leo Collins, General Electric Co., manager of environmental programs, Schenectady, N.Y.

R. Gardner Congdon, town supervisor, Moreau, New York

Robert Cozzy, senior sanitary engineer, New York DEC, Division of Hazardous Waste Remediation

Thomas Dunkelman, EPA project manager (Price Landfill, N.J.)

Edward Finnerty, EPA project manager (northern New Jersey)

Donald Grasso, Department of Public Works, Village of Suffern, N.Y.
Jeanne Hanson, senior environmental planner, Cape May County, New Jersey
Mel Hauptman, EPA section chief, Hazardous Waste Division

Richard Kaplan, EPA project manager (Suffern Village, Havilland Complex, New York)
Edgar Kaup, New Jersey Department of Environmental Protection (NJDEP), Division of Water Resources
Bruce Kenney, town supervisor, Olean, New York

Kathleen Meers, grants coordinator, Township of Middle, New Jersey
Curt Overcast, New York Legislative Commission on Toxic Substances and Hazardous Waste
Edward Putnam, NJDEP, assistant director of planning and design
Scott Rodabaugh, New York DEC, sanitary engineer

Vincent Salvatoriello, Chester, N.J. Health Department

(Region 2, cont.)

Christopher Sebastian, EPA project manager (Caldwell Trucking, N.J.)
Richard Schwartz, EPA project manager (Comb Fill North, Comb Fill South, Krysowaty Farms)
Pamela Tames, EPA project manager (Olean Well Field)

Edmund Taylor, NJDEP, division of engineering services

Thomas Uzzo, EPA project manager (Williams Property, Friedman Property, N.J.)

REGION 3

Hector Abreu-Cintron, EPA project manager (W. Va. Ordnance)

Donald Becker, Pennsylvania Department of Environmental Protection (PA-DEP), Superfund section, section chief

Pamela Hayes, W. Va. Department of Natural Resources, division of waste management

Victor Janosik, EPA remedial project manager (Lehigh Electric, PA)
Robert S. Kraus, director, division of Parks and Recreation, York County, Virginia

Robert Miles, chief of Wildlife Division, McClintock Wildlife Station, W. Va.
Eric Neuman, EPA project manager (Chisman Creek)

REGION 4

Ann Asbell, EPA Office of Regional Counsel (ORC), (Powersville Landfill, GA, Newport Dump Site, KY, Lees Lane Landfill, KY)
Julie Baker, Dade County (FLA) Department of Environmental Resources, division of planning and evaluation

Beverly Houston, EPA Superfund branch, unit chief (Lees Lane Landfill, KY)

Dennis Manganiello, EPA project manager (Newport Dump site)

Ben Moore, EPA project manager (Powersville Landfill)

James Orban, EPA project manager (Biscayne Aquifer sites)

Dennis Weylan, Jefferson County (KY) Health Department

Randolph Williams, Georgia Department of Environmental Protection

REGION 5

Lonna Bielke, Minnesota Pollution Control Agency (Morris Arsenic, Burlington Northern)
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Robert Mueller, Illinois State Attorney General's Office, assistant attorney general
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Blake Velde, OWPE Compliance Branch (Rocky Mountain Arsenal)

IX. APPENDICES

A. Consent Decree, Seymour, Indiana (excerpts)

B. Lease Agreement, Virginia Electric and Power Co. and York County, Virginia (Chisman Creek)

APPENDIX A (SEYMOUR, INDIANA)

of the Settling Defendants to undertake and complete work under this Decree. Each contractor and subcontractor shall be qualified to do those portions of the work for which it is retained. Each contractor shall be deemed to be related by contract to each Settling Defendant within the meaning of 42 U.S.C. §9607(b)(3).

(13) "Cost-Effective" means a cost-efficient means of achieving the level of environmental and health protection provided for in this Decree, as reflected in the Cleanup and Performance Standards contained in this Decree, or of meeting other requirements of this Decree.

(14) "Deep aquifer" means the sand and gravel aquifer under and around the Seymour site overlying the shale bedrock and underlying a semi-permeable confining layer. The deep aquifer is more fully described in Section 5.3.2. of the Remedial Investigation Report.

(15) "Defendants" means the original defendants to this action, defendants added by the second amended complaint, and all third-party defendants added by third-party complaints.

(16) "EPA" means the United States Environmental Protection Agency.

(17) "Groundwater" means water contained in the ground below the water table.

(18) "IDEM" means the Indiana Department of Environmental Management.

(19) "National Contingency Plan" or "NCP" means the National Oil and Hazardous Substances Contingency Plan promulgated under 42 U.S.C. §9605, at 40 C.F.R. Part 300.

(20) "Nearest Receptor" means the residence, non-agricultural working place, or other place of continued presence of humans that is closest to the boundaries of the Seymour Site, as determined at the time that the calculation of risk is performed. The determination of the Nearest Receptor is made in the direction that is downgradient from the site in the case of groundwater and in the direction that is downwind from the site in the case of air emissions.

(21) "Off-site" means beyond the boundaries of the Seymour Site.

(22) "On-Scene Coordinator" or "OSC" means the federal official defined at 40 C.F.R. §300.6, and identified pursuant to Section XIX of this Decree.

(23) "On site" means within the boundaries of the Seymour Site.

(24) "Parties" means all persons or entities who sign this Consent Decree.

(25) "Plume Stabilization Project or System" means the project or system for groundwater extraction and treatment implemented pursuant to the Agreed Order Regarding Plume Stabilization Project.

approved by EPA pursuant to the RAP, to determine the treatment or disposal requirements for the run-off. Settling Defendants shall inspect the surface run-off controls on a regular basis.

SECTION XIII

WELL SEALING AND ABANDONMENT

53. Consent of Owners. Within 90 days of the entry of this Decree, the Settling Defendants shall complete a survey of all residences and businesses in the Snyde Acres area, as defined on Exhibit 6 hereto, to determine if the owners of such businesses and residences who have alternate water supplies desire to have any private well on their property sealed. The Settling Defendants shall provide to EPA and IDEM a copy of the survey conducted, including the names and addresses of all persons contacted and their decisions with regard to this matter, and copies of any agreements made pursuant to this paragraph.

54. Sealing and Abandonment. Within 90 days of completing the survey provided for in the preceding paragraph, the Settling Defendants shall seal and abandon, in accordance with State law, all wells for which they have obtained the owner's permission.

55. Submission of Plans. Within 90 days of entry of this Decree, Settling Defendants shall submit for EPA's and IDEM's approval technical plans for well sealing and abandonment, in accordance with this Decree and the RAP.

SECTION XIV

LAND RESTRICTIONS

56. Fence. The Settling Defendants shall install a security fence which surrounds and encloses the cap, the soil vapor extraction system, a perimeter service road around the cap and the extraction and monitoring wells that are located at or adjacent to the site boundaries. The Settling Defendants shall also install a security fence around the groundwater treatment facility. Warning signs shall be installed prominently in appropriate places on the outside of the security fence(s). The fences and signs shall be installed in compliance with the specifications of the RAP.

57. Freeman Field Industrial Park Wells. The City of Seymour and its Board of Aviation Commissioners (hereinafter, the "City") agree to prohibit the installation or operation of any wells on the City's property adjacent to the Seymour Site, known as Freeman Field Industrial Park, that may interfere with the groundwater pumping or other remedial actions at the Seymour Site or cause human exposure to contaminants from the Site, until the post-termination groundwater monitoring required under this Consent Decree is completed. Any and all operation shall be prohibited that could interfere with the Seymour Site remedial action, including but not limited to changes in plume stabilization or groundwater flow directions, a significant increase in flow rate from the shallow to the deep aquifer in the vicinity of the Site or reduction of the potential production

capacity of wells that are installed as part of the remedial action. Upon completion of a study and determination by EPA of the level of operation of the City's existing or future wells that could cause such interference, if any, the City agrees to execute and file deed restriction(s) setting forth such restrictions. In the interim period before such deed restrictions are executed, the City agrees not to increase the average pumping rates of its existing wells significantly or to install new wells without prior approval by EPA. Any dispute arising under this paragraph shall be resolved in accordance with Section XXI of this Decree.

58. Seymour Site. The City has executed, and shall file within 15 days of the entry of this Consent Decree, the deed restrictions attached as Exhibit 7 hereto, prohibiting any consumptive or other use of the groundwater underlying the Seymour Site that could cause exposure to humans or animals, prohibiting any residential or commercial use or any other use that would allow continued presence of humans at the Seymour Site, and prohibiting installation, construction or use of any buildings, wells, pipes, roads, ditches or any other structures at the Seymour Site except as approved by EPA as consistent with this Decree and the RAP. The prohibition on the use of groundwater under the Site shall continue in perpetuity; the other restrictions shall remain in full force and effect so long as maintenance of the Cap pursuant to Section XI or any other remedial action work is required hereunder.

59. Land Use on City Property Adjacent to Seymour Site. The City has executed, and shall file within 15 days of entry of this Consent Decree, deed restrictions attached as Exhibit 8 hereto prohibiting: 1) the use of the areas described therein in any manner that could cause exposure of humans or animals to contaminated groundwater in concentrations that present or may present a threat to health (*i.e.* concentrations above the Cleanup Standards set forth in paragraph 17 above); 2) the use of the areas described therein that could interfere with the remedial action for the Site as described in this Decree and the RAP; and 3) any residential, commercial or other use that would allow continued presence of humans. Restrictions 1 and 2 above shall remain in full force and effect until post-termination groundwater monitoring under paragraph 23 of this Decree is completed and this Consent Decree has been terminated. Restriction 3 above shall not apply after termination of this Consent Decree, except that during the post-termination groundwater monitoring period no use of groundwater beneath the areas described in Exhibit 8 shall occur without prior notice and opportunity to object as set forth in Exhibit 8. In any event, the Board of Aviation Commissioners may petition EPA to terminate this restriction after EPA has given its approval to discontinue air monitoring pursuant to Section 6.2.1.4 of the RAP. In the event that attainment of one or more Cleanup Standards at the Site boundaries is not achieved and a technical impracticability waiver is granted by EPA pursuant to paragraph 24 hereof, the

deed restrictions applicable to prevention of exposure of humans or animals to contaminated groundwater shall continue in perpetuity, unless otherwise agreed to by EPA.

60. Additional Restrictions on City Property. Upon request by the United States, the State, or the Settling Defendants, the City shall execute any additional easements, deed restrictions, land use limitations, or other enforceable instruments which are necessary to prevent exposure of humans or animals to contaminated groundwater in concentrations that present or may present a threat to health, to prevent interference with implementation of remedial action for the Seymour Site, or otherwise to ensure the proper performance of the requirements established under this Decree.

61. Private Properties. The Settling Defendants shall seek any additional easements, deed restrictions, land use limitations, or other enforceable instruments restricting private property use which are necessary to enable implementation of or to prevent interference with remedial action for the Seymour Site.

62. Filing. Within 15 days of the entry of this Decree, the City shall file a copy of the Decree with the Office of the Recorder of Jackson County (the "Recorder"). The City shall file the deed restrictions annexed as Exhibits 7 and 8 hereto with the Recorder within 15 days of the entry of this Decree, and shall file any additional instruments executed

pursuant to paragraphs 57 or 60 above within 5 business days of their execution.

63. Dispute Resolution. Any dispute that may arise with respect to compliance with the provisions of this Section or interpretation or enforcement of any easement, land use limitation, deed restriction or other instrument executed pursuant hereto shall be resolved by this Court pursuant to the dispute resolution provisions of Section XXI of this Decree.

SECTION XV

EPA PERIODIC REVIEW OF REMEDY TO ASSURE PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

64. Pursuant to Section 121(c) of CERCLA, EPA shall review the remedial action taken at the Seymour Site at least every five (5) years following the date of entry of this Consent Decree to determine whether the remedy is adequately protecting human health and the environment.

65. Notwithstanding any other provision of this Consent Decree, if upon such review EPA determines that further action is appropriate, EPA may take or require such action as may be authorized under Sections 104 or 106 of CERCLA. Settling Defendants reserve any rights they may have to contest or defend against any such action.

66. Nothing in this Decree shall be construed to require Settling Defendants to implement any technology or technologies other than those of the types specified in this Decree unless EPA determines that the use of such technology is necessary to protect human health and the environment.

EXHIBIT 8

DEED RESTRICTIONS

The BOARD OF AVIATION COMMISSIONERS OF SEYMOUR, INDIANA (the "Board", also known as Seymour Aviation Commissioners), hereby imposes restrictions on the following described real estate which surrounds the property known as the Seymour Recycling Corporation site (the "Seymour Site") in Jackson County, in the State of Indiana:

> A part of the West half of Section 25, Township 6 North, Range 5 East, in Jackson County, Indiana, more particularly described as follows:
>
> Beginning at the Northwest corner of Section 25, Township 6 North, Range 5 East, said corner being marked with a corner stone, thence South 1 degree and 13 minutes East along the West line of said Section 25, for a distance of 2800 feet; thence North 88 degrees 40 minutes East, 2800 feet; thence North 1 degree and 13 minutes West for a distance of 2800 feet to a point on the North line of said Section 25; thence South 88 degrees and 40 minutes West along the North line of said Section 25 for a distance of 2800 feet to the point beginning and containing 180 acres more or less.

The deed restrictions imposed herein do not govern use of the Seymour Site, which is located within the above-described real estate and is described in Exhibit 7 to the Consent Decree in United States v. Seymour Recycling Corp. et al., No. IP-80-457-C. Use of the Seymour Site is governed instead by the Deed Restrictions set forth in Exhibit 7 to the Consent Decree described below.

The following restrictions are imposed upon the Real Estate described in this Exhibit for the purpose of preventing interference with the performance of remedial action pursuant to the Consent Decree approved by the United States District Court for the Southern District of Indiana, Indianapolis Division on ___ __________, 1988 (the "Consent Decree") and are required by paragraph 59 of the Consent Decree:

1. There shall be no use of the Real Estate in any manner that could cause exposure of humans or animals to contaminated groundwater in concentrations that present or may present a threat to health (i.e. concentrations above the Cleanup Standards set forth in paragraph 17 of the Consent Decree).

2. There shall be no use of the Real Estate that will interfere with the remedial action for the Seymour Site as described in the Consent Decree and the Remedial Action Plan, which is attached to the Consent Decree as Exhibit 5.

3. There shall be no residential or commercial use of the Real Estate that would allow continued presence of humans, including but not limited to the construction, installation or use of buildings for residential or commercial use of this Real Estate that would allow such continued presence. Prohibited uses of this Real Estate shall not include agricultural crop growing and land application of sludges from the City of Seymour, Indiana publicly-owned treatment works.

Prior to permitting any use of the Real Estate, the owner of the Real Estate shall give at least sixty (60) days prior notice of the intended use to the parties to the Consent Decree. Prior notice shall not be required for agricultural crop growing, unless irrigation will be allowed or used, or for land application of sludges from the City POTW. Any party objecting to such use as violating the restriction(s) set forth herein shall so notify the owner of the Real Estate in writing within thirty (30) days of receipt of such notice. If necessary to resolve the dispute, any party to the Consent Decree may move the Court (the United States District for the Southern District of Indiana, Indianapolis Division) for a resolution of the dispute in accordance with Section XXI of the Consent Decree.

The restrictions in paragraphs 1 and 2 of this deed restriction shall run with the land and shall remain in full force and effect until the Consent Decree is terminated by the United States District Court for the Southern District of Indiana, Indianapolis Division, pursuant to Section XXXIV of the Consent Decree, and all post-termination groundwater monitoring is completed.

The restrictions in paragraph 3 of this deed restriction shall not apply after termination of the Consent Decree, except that during the post-termination groundwater monitoring period no use of groundwater beneath the real estate described herein shall occur without prior notice and opportunity to object under the above provisions of this deed restriction. In any event, the Board of Aviation Commissioners may petition EPA to terminate the restrictions in paragraph 3 of this deed restriction after EPA has given its approval to discontinue air monitoring pursuant to Section 6.2.1.4 of the RAP, attached as Exhibit 5 to the Consent Decree.

The undersigned persons executing these Deed Restrictions on behalf of the Board represent and certify that they are duly authorized members of said Board and have been fully empowered, by proper resolution of said Board and by compliance with any other applicable requirements of law, to execute and deliver these Deed Restrictions.

IN WITNESS WHEREOF, the said Board of Aviation Commissioners of Seymour, Indiana (also known as Seymour Aviation Commissioners) have caused these Deed Restrictions to be executed this 4th day of August, 1988.

Board of Aviation Commissioners
of Seymour, Indiana (also known
as Seymour Aviation Commissioners)

Seal

By: ______________________

____

ATTEST:

____

William L. Callison

____

STATE OF INDIANA)
) SS:
COUNTY OF Jackson)

Before me, a Notary Public in and for said County and State, personally appeared ROBERT R. MYERS and STANLEY E. GARVEY and WILLIAM L. CULLISON and ________ and ________, respectively, of the Board of Aviation Commissioners of Seymour, Indiana (also known as Seymour Aviation Commissioners) a Department of the Executive of the City of Seymour, Indiana, and acknowledge the execution of the foregoing Deed Restrictions on real estate surrounding the Seymour Recycling Corporation Site for and on behalf of said Board.

Witness my hand and Notarial Seal this 4th day of August, 1988.

My commission expires:
1/13/92

Signature
Printed JEFFREY LORENZO
Notary Public

Residing in Jackson County, Indiana

This document was prepared by Catherine R. McCabe, attorney at law.

January 20, 1988

Chisman Creek

Appendix B

AGREEMENT

THIS AGREEMENT, dated as of January __, 1988, between VIRGINIA ELECTRIC AND POWER COMPANY, a Virginia corporation (Virginia Power), and THE COUNTY OF YORK, VIRGINIA, a county of the Commonwealth of Virginia (the County), recites and provides:

RECITALS:

1. The County desires to purchase certain property in the County of York owned by Ray L. Hyatt and Rita W. Hyatt (the Hyatt Property) as more particularly described on Exhibit A. The County's purchase of the Hyatt Property is in connection with the County's plan to utilize the Chisman Creek Superfund Site (the Site), as defined in that certain Consent Decree (the Decree) executed by Virginia Power on September 16, 1987 between Virginia Power and the Environmental Protection Agency, for public purposes.

2. To induce the County to grant Virginia Power rights of access over the Hyatt Property to perform all remedial work required pursuant to the Decree, Virginia Power has agreed to indemnify and hold the County harmless from all liability for expenses or costs that may arise from the County's ownership due to the existence of fly ash on the Hyatt Property except any fly ash generated or disposed of thereon by the County.

AGREEMENT:

1. County's Purchase and Grant of Access.

If the County purchases the Hyatt Property, the County will grant to Virginia Power an easement in, on, under, upon, over and across the Hyatt Property limited to the purpose of performing all remedial work necessarily required by the Decree and all other work necessarily incident thereto, this shall include the right to construct and improve any necessary access, structures or other facilities; provided, however, the location thereof shall be as approved by the County, which approval shall not be unreasonably withheld or denied, and Virginia Power shall be responsible for repair or replacement at its cost of any of the County facilities, equipment, structures, or other improvements.

2. Virginia Power's Indemnity. Virginia Power agrees to indemnify and save the County harmless from all costs, expenses, damages, claims, liability, actions and causes of action that may arise from or because of any fly ash placed or disposed of on the Hyatt Property or the Site except any fly ash that shall have been generated or disposed of by the County; provided, however, that the foregoing indemnity shall extend solely to the County only as long as it owns the Hyatt Property and shall not extend or inure to the benefit of any other persons or parties. Such indemnity shall specifically include, without limitation, all such costs, expenses, damages, claims, liability, actions and causes of action incurred by the County or involving the County pursuant to provisions of either the Resource Conservation and Recovery Act or Comprehensive Environmental Response, Compensation and Liability Act of 1980, as now appearing and as hereafter amended from time to time, together with all regulations

promulgated pursuant thereto. Such indemnity shall also include any costs, expenses, damages, claims, liability, actions and causes of action incurred by the County or involving the County by virtue of any modification of the Decree or the termination thereof.

3. Miscellaneous. This Agreement shall be governed by the laws of the Commonwealth of Virginia. This is the entire agreement between the parties and no amendments or additions hereto shall be valid unless in writing and signed by all of the parties. This Agreement shall be binding upon, and shall inure to the benefit of, all legal representatives, heirs, executors, administrators, successors and assigns of the parties hereto. If any provision of this Agreement shall be declared to be unenforceable by a court of competent jurisdiction, the remaining provisions hereof shall continue to be valid and enforceable to the fullest extent permitted by law.

4. Approval of Agreement. As required by Section 15.1-286 of the Code of Virginia, 1950, as amended, the form of this Agreement is approved by the County Attorney on behalf of the County pursuant to a duly adopted resolution of such Board.

R88-34

BOARD OF SUPERVISORS
COUNTY OF YORK
YORKTOWN, VIRGINIA

DRAFT

Resolution

At a regular meeting of the York County Board of Supervisors held in the Courts and Board Room, York County Courts and Office Center, Yorktown, Virginia, on the _____ day of _______-_________, 1988:

Present	Vote
Julia A. Jensen, Chairman	
James W. Funk, Vice Chairman	
W. Ward Anderson, Jr.	
Jere M. Mills	

On motion of ______________, which carried _____, the following resolution was adopted:

A RESOLUTION AUTHORIZING THE CHAIRMAN OF THE BOARD OF SUPERVISORS TO SIGN A RELEASE AGREEMENT WITH VIRGINIA ELECTRIC AND POWER COMPANY THAT WILL HOLD THE COUNTY OF YORK HARMLESS FOR PROBLEMS THAT MAY ARISE DUE TO FLYASH CONTAMINATION ON PROPERTY KNOWN AS THE HYATT PROPERTY AND TO GRANT VIRGINIA POWER AND ELECTRIC COMPANY AN EASEMENT ON SAID PROPERTY IF ACQUIRED BY THE BOARD OF SUPERVISORS

WHEREAS, the York County Board of Supervisors is considering acquiring 13.86 acres of property known as the Hyatt Property which is adjacent to approximately 14.47 acres of property owned by the Virginia Electric and Power Company which has been identified by the Environmental Protection Agency as part of the Chisman Creek Superfund Site; and

WHEREAS, it is the desire of the York County Board of Supervisors to use both of the above-mentioned properties for public recreational purposes; and

WHEREAS, prior to purchasing said property, the York County Board of Supervisors desires to have Virginia Electric and Power Company indemnify and save the County of York harmless from all costs, expenses, and damages that may arise due to flyash contamination that has or may in the future occur on the Hyatt property; and

WHEREAS, the Virginia Electric and Power Company would like to secure access on the Hyatt property in order to perform remedial work required pursuant to a decent decree executed between the Virginia Electric and Power Company and the Environmental Protection Agency; and

WHEREAS, the Virginia Electric and Power Company has offered to provide the above referenced indemnity in exchange for the County of York providing the above-mentioned right of access over the Hyatt property;

NOW, THEREFORE, BE IT RESOLVED by the York County Board of Supervisors this ____ day of __________, 1988, that the Chairman of the Board of Supervisors be, and is hereby, authorized to execute on behalf of the Board of Supervisors an agreement providing the Virginia Electric and Power Company rights of access over the Hyatt property to perform remedial work associated with the Chisman Creek Superfund site in exchange for an agreement whereby Virginia Power would indemnify and hold the County of York harmless due to any problems which have or may arise from flyash contamination on the Hyatt property. Said release agreement shall be approved by the County Attorney as to both form and content, and the Clerk of the Board of Supervisors is hereby authorized and directed to affix the seal of York County thereto and attest the same;

BE IT FURTHER RESOLVED that the County Administrator and the County Attorney may revise said release agreement, and/or agree to its revision, in any particular considered not material prior to its being signed by the Chairman of this Board, provided, and subject to the condition, that all such revisions are pointed out to the Chairman prior to her executing said release agreement, and she is hereby authorized to approve such revisions by the act of signing said agreement.

BE IT STILL FURTHER RESOLVED that the release agreement tendered to this Board be incorporated by reference as a part of the minutes of this meeting but shall be kept in a separate file and not reproduced as a part of the minutes.